The development, implementation, and evaluation of the Hybrid-Online Hatch-Out Program

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The development, implementation, and evaluation of the Hybrid-Online Hatch-Out Program

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A Thesis
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Master of Science
in Agricultural and Extension Education
in the School of Human Sciences

Mississippi State, Mississippi

December 2021
In today’s society, the majority of our population lacks knowledge about agriculture and its importance. Therefore, there is a demand for agricultural programs to increase a general knowledge of agriculture. This study aimed to develop, pilot test, and evaluate the Hybrid-Online Hatch-out Program. Due to limited resources with the current Hands-on Hatch-out program, this Hybrid-Online Hatch-out Program could reach a larger population of youth and aid in educating more youth about poultry (one of the largest sectors of agriculture). The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance) was utilized to guide the evaluation process. The program was pilot tested in two elementary schools with 14 teachers and 172 students in Pre-K through first grade. Overall, teachers were satisfied with the program, indicated that it was feasible to implement, and planned to repeat the program in the future. Additionally, students’ pre- to post-program increase in poultry knowledge was statistically significant.
DEDICATION

To my children, Caeden and Baylor, may you work hard for your dreams no matter what phase of life that dream may come.
ACKNOWLEDGEMENTS

First, I would like to thank my Lord and Savior, Jesus Christ, for all the hills and valleys and above all blessings that got me to where I am today. I owe it all to him. To all my family and friends, and colleagues, I could never be more grateful to each of you for all your support throughout this experience.

A special thank you to my husband, Cody, for picking up the pieces and holding us together throughout this journey. Thank you to my children for the hugs, kisses, and smiles that kept me going. To my parents who instilled a hard work ethic and inspiration to be my best self. Thank you to my mother, Barbara, for being my rock and sacrificing so much for me and my family, and to my father, Leland, for keeping my sanity with your humor and always reminding me of my strength. Thank you to each of you for loving me unconditionally and encouraging me to accomplish my dreams.

To my friends and colleagues, Dr. Jessica Wells and Dr. Kelley Wamsley, thank you for all your leadership and guidance as well as loving comments and encouragement along the way. To my department head, Dr. Mary Beck, for inspiring me and sparking my interest as well as always guiding, supporting, and believing in me throughout the years. Thank you to my major professor, Dr. Donna Peterson, for accepting me and taking the time to listen and consider my interest as well as the countless hours of feedback and advice along the way. Thank you to my committee members for the advice and future considerations for this program, and to Marissa Powell and Peyton Taylor for all your hard-work and dedication to help with this study.
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CHAPTER I
INTRODUCTION

In 1988, the National Research Council (NRC) indicated that an agriculturally literate person would not only possess knowledge and understanding of the food and fiber system, but also expand beyond that understanding and include “its history and its current economic, social, and environmental significance to all Americans” (p. 8). The lack of agricultural literacy has been an ongoing issue affecting U.S. society for decades (Powell et al., 2008). This lack of agricultural literacy is relatable to an ever-growing global population where only 2% of Americans are involved in agriculture. Therefore, the need for understanding our agriculture system is of utmost importance today (Roberts et al., 2016). Since many individuals lack direct agriculture exposure, the implementation of education agricultural programs could potentially increase awareness (Frick et al., 1995).

Since the publication of Understanding Agriculture: New Directions for Education in 1988, the NRC brought awareness of the need for agriculturally-based curricula implemented in schools to strengthen agricultural literacy within the United States. For the last several decades, increasing agricultural literacy has become the focus of many researchers and educators (Kovar & Ball, 2013). Some have developed new findings that propose expansions and revisions to the initial definition of the NRC – all of which conclude individuals should be able to understand agriculture and communicate their understanding of agriculture (Frick et al., 1991, 1992;
Meishchen & Trexler, 2003). Additionally, an effort to strengthen the existing agricultural education of youth and teachers alike has been encouraged (Balschweid et al., 1997).

**Statement of the Problem**

According to the American Farm Bureau Federation (2021a), 2% of the country’s population is farm and ranch families. Urbanization has caused issues of agriculture to seem of little importance (Kovar & Ball, 2013). With the global population estimated to increase by 2.2 billion by 2050, farmers around the world will need to produce 70% more food than they do now (American Farm Bureau Federation, 2021a). The country’s ability to feed its citizens depends on a solid agricultural sector (Birkhaeuser, 1991). Therefore, the agricultural system depends on the education of generations to come. One important sector of agriculture is poultry. The United States poultry industry is the world’s largest broiler and egg producer (United States Department of Agriculture, 2021). According to The U.S. Poultry and Egg Association (2020) Economic Impact Study, the poultry industry is responsible for a large portion of the job labor in the United States (~1.4 million) and contributes $576.57 billion to the U.S. economy. More specifically, poultry is the #1 ag commodity in Mississippi, and with employment of over 25,000 people (Tabler & Wells, 2017), the poultry industry adds approximately $1.89 billion to Mississippi’s economy yearly (MSU Extension Service and National Agricultural Statistics Service, 2020). Mississippi also ranks in the top five broiler-producing states nationwide (National Chicken Council, 2020). The poultry industry in Mississippi contributes to the main protein supply of the United States and the world (Tabler & Wells, 2017); however, individuals know little about this industry (Erian & Phillips, 2017).
General Background of the Problem

Erian and Phillips (2017) explain, “Consumers’ selection of food is governed by many factors, including culture, religion, lifestyle, diet, knowledge, health concerns and food trends, often influenced by the media” (p. 1). By 2050, according to the American Farm Bureau Federation (2021a), farmers will be required to produce 70% more food than current production to meet the demand of the ever-growing population. Roberts et al. also states that (2016), “If US agriculture is going to continue to meet the needs of the U.S. population and address growing global needs, agriculture must be understood and valued by all” (p. 14). Yet, Americans today have little knowledge of agriculture. Hutcheson (2020) confirmed that even after three decades of effort to increase agricultural literacy, there is still a need for improvement.

While incorporating agricultural education as part of a formal classroom curriculum is an option for improving agricultural literacy among youth, nonformal education programs are another option. A program is defined as “a comprehensive set of activities that includes an educational component that is intended to bring about a sequence of outcomes among targeted clients” (Israel et al., 2011, p. 1). Those involved in agricultural literacy realize this lack of education; therefore, many programs in the U.S. aim to promote agriculture and agricultural literacy. One example of the implementation of agricultural literacy into classrooms is the University of Vermont’s (2021) Youth Agriculture Project, which serves to “help young people build life and job skills through hands-on learning about food, nutrition, and agriculture” (para. 1). Also, the National Institute of Food and Agriculture’s National Agriculture in the Classroom (National Agriculture in the Classroom, 2020) is another example of a general agriculture literacy program. When looking specifically at poultry agricultural literacy, there are very few programs available. One example of a program specific to poultry is Purdue University’s Poultry
in the Classroom (Erickson et al., 2019). This program is an online program implemented at the high school level, and evaluations of this program have been conducted.

Specific to the state of Mississippi, Mississippi State University (MSU) Poultry Science Department, through the Mississippi State University Extension Service (MSUES), provides youth within Mississippi an experiential poultry learning curriculum through the Hands-on Hatch-out Program developed for elementary students. This curriculum is intended for elementary age youth to gain a better understanding of poultry as well as the industry (Mississippi State University Extension Service, 2021). Currently, the curriculum is in the process of being updated and validated (Department of Poultry Science Mississippi State University, 2020); however, it is yet to be completed. One problem with the current Hands-on Hatch-out Program is with implementation across the state. There are eighty-two counties in Mississippi and limited staff to implement the current Hands-on Hatch-out Program curriculum using the traditional face-to-face delivery method. With technology, youth can experience content in a new way (Redmann & Kotrlik, 2009). Development of an online version of the Hatch-out Program could give those populations unable to access the current Hands-on Hatch-out Program an alternative option.

It should be noted that some poultry agricultural literacy programs exist. Even though there are some of these programs available, and multitudes of videos and educational materials available online, data on their effectiveness is limited. Although Erickson et al. (2019) have supporting data on efficacy of the program Poultry in the Classroom, this program is implemented in high schools and therefore does not aid in assisting with the gap in knowledge for poultry agricultural literacy programs and their effectiveness at elementary age implementation.
Purpose of the Study

Nonformal education programming activities include needs assessment and situational analysis, priority-setting, program development, marketing and recruiting, education implementation, evaluation, and reporting (Boone et al., 2002; Boyle, 1981; Harder, 2019). Such nonformal programming could help increase poultry agricultural literacy. Therefore, the purpose of this study was to develop, pilot test, and evaluate the curriculum of a hybrid-online version of the existing Hands-on Hatch-out Program curriculum for elementary-age students.

Based on the literature reviewed, a situation analysis with teachers, and recent experience with the Hands-on Hatch-out Program, an online version was developed for use in elementary school classrooms. This program was not intended to replace the current Hands-on Hatch-out Program but was designed to provide an alternative option statewide to accommodate counties at a disadvantage due to issues such as location, availability, and accessibility. The RE-AIM framework (Re-aim, 2021) guided the research questions for this study. Outcome evaluation (Effectiveness dimension) was conducted to assess knowledge change among elementary student participants and teachers, while process evaluation was used to document participating student and teacher satisfaction and successes and challenges involved in implementation (Reach, Adoption, Implementation, and Maintenance dimensions). Data collected were then utilized to identify needed modifications for enhancing the program’s effectiveness and feasibility of implementation.

Research questions

Reach

1. How many students participated in the program?

Adoption
2. How many teachers implemented the program?

Effectiveness

3. What prior knowledge of poultry and agriculture did elementary student participants possess before program implementation?
4. Did participating elementary students gain knowledge of poultry after the program?
5. Did participating teachers’ perceptions and knowledge of agriculture change as a result of the program?

Implementation

6. What are participating elementary students’ perceptions of the program?
7. What are the participating teachers’ perceptions of the program?
8. How feasible was implementation of the program?

Maintenance

9. How many teachers are likely to implement the program again?

Significance of the Study

MSU’s Department of Poultry Science’s Hands-on Hatch-out Program is one of the many agricultural education programs throughout Mississippi. However, mere implementation of a program is not enough to determine program success. Evaluation is a critical component of educational program implementation to identify flaws as well as learner outcomes. With the limitations of the current hands-on version of the Hatch-out Program, the development, implementation, and evaluation of a hybrid-online version could provide another opportunity to educate more youth of Mississippi about agriculture.

With most of the population of America being so far removed from agriculture production, there is little knowledge of agricultural concepts and the importance of agriculture to
society. While programs such as the Hatch-out could aid in an understanding of agriculture and thus increase agricultural literacy, it is equally important to evaluate those programs to assess their effectiveness and determine the most feasible way to implement online, nonformal education programs. This study can contribute to understanding how to implement agricultural literacy programs for elementary-age children across the state.

Assumptions

1. Participants answered all questions to the best of their knowledge.
2. Teachers implemented the Hybrid-Online Hatch-out Program in its entirety.
3. Instruction by teachers to students was delivered with fidelity to the curriculum.

Definitions

*Agricultural literacy:* The idea of possessing “some knowledge and understanding of our food and fiber production, processing, and domestic and international marketing” (National Research Council, 1988, p. 9).

*Agricultural education:* “a systematic program of instruction available to students desiring to learn about the science, business, technology of plant and animal production and/or about the environmental and natural resources systems” (Future Farmers of America, 2021, para. 3).

*Hands-on Hatch-out Program:* MSU Poultry Science Department’s unique experiential learning opportunity to schools around the state with a curriculum that includes live hatching within the classroom (Mississippi State University Extension Service, 2021).

*Hybrid-Online Hatch-out Program:* MSU Poultry Science Department’s online version of the current Hands-on Hatch-out Program available as an alternative source. The online curriculum
provides PowerPoints, video footage of the hatching process, other education videos, and hands-on activities.
CHAPTER II
REVIEW OF LITERATURE

Introduction

In thirty years, the world population is expected to increase by 2.2 billion people (American Farm Bureau Federation, 2021a). Currently, Americans are two to four generations removed from the farm (American Farm Bureau Federation, 2021b; Powell et al., 2008), and 2% of our country is helping to feed the rest of the population (American Farm Bureau Federation, 2021b). Because individuals are far removed from agriculture, there is a limited knowledge of agriculture (Frick et al., 1995). Therefore, there is a desire to understand the most effective way to increase agricultural literacy around the world (Frick et al., 1995; Hillison, 1998; Hutcheson, 2020; Lewis, 2018). The term “agricultural literacy” was established in 1988 when the NRC (1988) defined agricultural literacy as the idea of possessing “some knowledge and understanding of our food and fiber production, processing, and domestic and international marketing” (p. 9). Thus, efforts to increase agricultural instruction were encouraged, along with the development of new ideas and management to increase agricultural literacy levels (NRC, 1988). According to the NRC (1988), not only should a person have some knowledge of agriculture, but an agriculturally literate person should have an understanding “its history and its current economic, social, and environmental significance to all Americans” (p. 8). Agricultural education programs are one way to increase agricultural literacy.
Agricultural Education Programs

The implementation of agricultural education programs is important to addressing agricultural literacy issues in our nation. Since the development and initial implementation of Agriculture in the Classroom in 1981, almost every state has utilized the program (Hillison, 1998). Each state’s program across the nation is organized differently depending on the state or territory (National Agriculture in the Classroom, 2020). Mississippi Agriculture in the Classroom specifically was developed by the MSU School of Human Sciences; however, it is currently coordinated and managed by the Mississippi Farm Bureau Federation (Mississippi Farm Bureau Federation, 2020). When evaluating its effectiveness, Mississippi Agriculture in the Classroom was implemented with 4th-grade students at an Oktibbeha County elementary school. Results demonstrated a minimal increase in student knowledge of agriculture (Hutcheson, 2020). However, a similar study conducted in Illinois with the Agriculture in the Classroom curriculum focused on a variety of grades K-5 (each with grade-level appropriate materials) and showed a positive gain in students’ knowledge after the curriculum was implemented (Fischer, 2017). Hutcheson (2020) recommended a combination of agricultural literacy efforts and training for teachers on how to utilize the materials and curriculum in classrooms to ensure learners grasp and retain the information.

Mississippi State University Poultry Hatch-out Program

One specific example of an agricultural education program for children is MSU’s Hands-on Hatch-out Program. The Hands-on Hatch-out Program provides students with the opportunity to complete a weeklong course in chick development (MSUES, 2021). With this science-based curriculum, students can observe the live hatching of a chick while also completing activities to further their knowledge of poultry. Each day incorporates a new learning experience from
embryonic development to hatching of the chick. Furthermore, the program provides insight to students on the poultry industry and its significance to food production.

Teachers across the state request the current Hands-on Hatch-out Program from Dr. Jessica Wells, Assistant Clinical/Extension Professor in the MSU Poultry Science Department. Once requested, the university’s volunteers and employees transport a hatch-out set consisting of a portable incubator, aquarium, 20-21-day-old incubated eggs, chick supplies, and a curriculum packet to each of the requesting schools. Each set is delivered on a Monday, and a pre-test is administered to students upon arrival to assess knowledge before teachers implement any lessons. On Tuesday, classroom teachers begin delivering the educational content, which includes chick development during the incubation lesson. This is aimed to develop an understanding of the incubation and stages of embryonic development. Wednesday’s lesson provides guidance on how to properly care for a chick after hatch. At this point within the week, chicks have hatched in the classroom, and students are able to practice caring for them. Thursday’s lesson includes information on the importance of the poultry industry to food production. After all lessons are implemented, students complete a post-test to assess knowledge after the program, with a subsequent lecture from Dr. Wells’ team on poultry and the importance of the industry.

Research on recent enhancements to and validation of this face-to-face, traditional Hatch-out Program are currently underway. Because the present study focused on the development, implementation, and evaluation of a Hybrid-Online Hatch-out Program, several factors were considered: teaching styles, online curriculum, internet accessibility, teachers’ need for agricultural and technology knowledge, nonformal education programs, and program process and outcome evaluation.
Teaching Styles

Traditional teaching, such as lecturing, continues to be a standard method within education (Kolesnikova, 2016). Some research provides evidence that individuals prefer a traditional as opposed to a nontraditional approach, such as online courses. However, issues due to design or instruction, such as lecturing, could influence learning preferences (Tularam & Machisella, 2018). While implementation of technology-based instruction is evolving, incorporating traditional as well as nontraditional methods may provide a greater achievement rate within the classroom (Nguyen et al., 2017). One nontraditional method is the use of iPads, which was shown to be a successful tool when compared to textbooks in Miglietta’s (2014) study assessing second grade science classrooms in Italy. Use of E-learning has also been suggested for self-motivated learners; however, evaluation may be needed to determine the students’ learning styles before implementation, and training sessions should be provided to instructors to ensure proper use of the E-learning environment (Tularam & Machisella, 2018). Additionally, McLaren and Kenny (2015) concluded that instructors lack the fundamental elements of change to incorporate nontraditional technologies within the classroom, and thus a greater percentage conduct a traditional approach. Furthermore, some research suggests that students prefer a traditional approach, although performance is not affected by a nontraditional approach, and adoption of nontraditional techniques should be considered as a secondary method of education delivery (Nurutdinova et al., 2016).

Online Curriculum

The use of online curriculum as a method of education has become popular over the decades (Sri & Krishna, 2014). In 2019, Erickson et al. suggested using a more technological approach to the implementation of agricultural education, specifically poultry. Erickson et al.
(2019) reported that student interests were low when given an online platform compared to that of an experiential learning approach or hands-on learning approach in the Poultry in the Classroom program. However, with the online program students not only showed growth in knowledge from the beginning to the end of the program, but they also showed more interest in poultry upon program completion (Erickson et al., 2019). Thus, the Poultry in the Classroom program showed the effectiveness of an online agriculture education program for high school students (Erickson et al., 2019). Therefore, an online format for MSU’s Hatch-out Program could serve as one component of a larger effort to increase agricultural literacy, given accessibility to the Internet.

**Internet Accessibility**

In an online learning environment, appropriate resources must be available for effective results. While the United States has seen a major increase in the use of computers and the Internet, the lowest levels of usage are seen in the rural South (U.S. Census Bureau, 2016). According to the Census Bureau (2019), only 71.5% of Mississippi households have broadband (high-speed Internet) subscriptions, which ranks Mississippi the lowest in the United States in terms of broadband coverage. This may be in large part due to the lack of access to internet services (LaRose et al., 2007). One of the major issues with internet connections in rural areas is hardware cost (Kone et al., 2020). Kone and colleagues (2020) assessed new interventions to overcoming these costs and providing low-cost options to rural populations, such as the low-cost Software-Defined Networking (SDN) environment. COVID-19 forced attention to internet accessibility around the world and the value of being digitally connected is expected to increase (Strusani & Houngbonon, 2020). In order to implement an online platform-based curriculum in a classroom, internet accessibility is critical (Ramli et al., 2020).
Teachers’ Need for Agricultural and Technology Knowledge

While the NRC (1988) encourages the integration of agricultural education within the classroom, there is a need for programs to develop teachers’ agricultural knowledge prior to program implementation (Terry et al., 1992). Hutcheson (2020) found that teachers have a difficult time incorporating agricultural concepts without guidance or experience. Programs such as the Summer Agriculture Institute aid in the agriculture education of teachers and their ability to implement agriculturally-based curriculum within their core subjects (Anderson et al., 2014). Unfortunately, due to the inability to locate resources regarding agriculture to incorporate in the classroom, little guidance on program instruction and materials or prior experience of the teacher could affect implementation (Hutcheson, 2020).

In addition to knowledge of agriculture, teachers must be comfortable with technology if an online agricultural literacy program is to be implemented. Teacher adoption of technology within the classroom has been investigated for some time; common barriers to implementation of technology within the classroom include lack of self-esteem, technology anxiety, and availability (Remann & Kotrlik, 2009). The question is not if technology will be used but instead is how to use technology within the classroom that is a critical challenge to educators (Couse & Chen, 2010).

To avoid the spread of the COVID-19 virus, the world’s education system was converted to a virtual setting, thus forcing the use of technology on teachers (Nambari, 2020). Not only did the sudden urgency to transition classes from face-to-face to a virtual platform provide teachers the opportunity to learn an online approach to teaching, but it also allowed for more assistance with the use of technology and user experience from online education platforms (Chen et al., 2020). Therefore, it is of utmost importance that teachers be trained in the use of technology
within the program they are utilizing to ensure ease of use and assistance to students (Chen & Chang, 2006; Romero-Tena et al., 2020; Roth, 2020).

**Nonformal Education Programs**

Nonformal education programs can be implemented as a stand-alone delivery method for agricultural education in the formal classroom or as a supplement to existing formal education. A “program” is defined as “a comprehensive set of activities that includes an education component that is intended to bring about a sequence of outcomes among targeted clients” (Israel et al., 2011, p. 1). Extension programming can be described in a variety of ways (Franz et al., 2015). Franz and colleagues (2015) explained that Extension programs can be classified anywhere from a single education event to addressing an issue through a more comprehensive effort.

Israel and colleagues (2011) also indicated that programs contain a combination of activities: “Programming activities include conducting a needs assessment and situational analysis, setting priorities, developing a program rationale and management plan, marketing and recruiting, hosting learning events, evaluating outcomes and reporting” (p. 2). Duttweiler (2012) proposed that use of an Extension program development model that includes an organized set of these programming activities creates nine key components utilized to better Extension programs, including improving outcomes, focusing on intended outcomes, and aiding in resource planning and management.

Assistance, support, and organization can be found to have an impact on the quality of program implementation (Gagnon et al., 2015). Researchers have found that support and leadership, whether technical or administrative, result in the best outcomes for program implementation (Durlak & DuPre, 2008; Wandersman et al., 2008). One important type of support is technical assistance. According to Wandersman and colleagues (2008), “technical
assistance includes the training of program facilitators and program administrators, program evaluation and feedback, program monitoring, coaching, involvement of facilitators in program design, and the additional resources available to program stakeholders (e.g., brochures, manuals, online communities)” (p.72), and increases program quality when utilized (Wandersman et al., 2008).

Without participants’ acceptance of a program, the program’s outcomes and implementation processes could be affected (Gagnon et al., 2015). Carroll and colleagues (2007) explained that “the less enthusiastic participants are about an intervention, the less likely the intervention is to be implemented properly and fully” (p. 3). Needs assessments or situation analyses can aid and address participant readiness towards Extension programs (Garst & McCawley, 2015). Complexity or simplicity of the program characteristics could also influence program implementation (Gagnon et al., 2015). While delivery of the program by the facilitator can impact the program as well (Gagnon et al., 2015), specific factors such as experience (Nobel et al., 2006), motivation (Dusenbury et al., 2003, 2005; Johnson et al., 2006), and competency (Milligan, 1998) are found to have an effect on program implementation as well as program outcomes. With the large majority of evaluations focusing on the outcomes of the program, the implementation stage in programs tends to suffer (Berkel et al., 2011). Thus, all of these factors should be considered when developing, implementing, and evaluating a nonformal education program.

**Program Process and Outcome Evaluation**

Evaluation is essential in determining whether a program is effective or needs altering (Rossi et al., 2019), but without proper evaluation tools, success cannot be determined. Program coordinators strive for successful programs and design programs with established goals that are
expected to address certain issues. Evaluation allows the program coordinator to identify issues within the program and allow for modifications and improvements within the program as needed.

Process evaluations focus on the quality of program content and implementation of the program (Rossi et al., 2019). When evaluating the process of a program’s implementation, it is important to consider six components: fidelity, dose delivered, dose received, satisfaction, reach, and recruitment. Fidelity considers whether all aspects of the program’s implementation followed the intended design. The extent to how much or how often a participant received the program could affect program effectiveness. Thus, documentation evaluating dosage received and delivered can aid in understanding of program effectiveness. Participant satisfaction with the program is critical for program success. Just as sales of a product increase due to satisfaction, the same holds true for programs. If the participants are unsatisfied with the program, discontent towards the program will be disseminated. It is equally important to ensure the target audience is being recruited and reached rather than under- or overrepresenting a certain population.

While process evaluation assesses the story behind the program’s delivery, outcome evaluation assesses the results of the program (Rossi et al., 2019). There are three types of outcome evaluation: short-term, medium-term, and long-term. Short-term outcomes refer to changes in knowledge, skills, attitudes, and/or opinions of participants. Medium-term outcomes refer to changes in behaviors or actions of participants. Long-term outcomes refer to condition or status changes due to program implementation. Without outcome evaluation, there would be no evidence of program effectiveness.

**RE-AIM Framework**

One framework that can be used to guide program evaluation is RE-AIM (Re-aim, 2021). RE-AIM was designed for health programs but has been used within Extension and is
recommended for a more widespread use in Extension (Downey et al., 2017). RE-AIM focuses on five dimensions: Reach, Effectiveness, Adoption, Implementation, and Maintenance. Reach refers to the population who participates or is exposed to the program. The Effectiveness dimension incorporates the outcome evaluation of the program or the most important achievements as well as any negative outcomes. The Adoption dimension identifies those individuals or organizations who implement the program. Several process evaluation components are included within the Implementation dimension (e.g., fidelity, dosage, satisfaction). Within the Maintenance dimension, sustained or long-term outcomes are considered, as well as the institutionalization of a program. Reach, Adoption, and Implementation are part of a process evaluation, while Effectiveness is part of an outcome evaluation, and Maintenance can be considered either process or outcome evaluation (Re-aim, 2021).

**Conclusion**

Agricultural literacy has been an ongoing issue for decades. There is a plethora of research on programs that have been developed and implemented with the intent to increase agricultural literacy. These programs encompass issues related to development and implementation such as internet accessibility, teachers’ knowledge and understanding of technology and agricultural concepts, as well as the process and outcome evaluation of the program. Also, these programs have been developed in both a traditional and non-traditional approach to address the need for increase agricultural literacy, but as noted, research in the use of online programs is limited. Therefore, this limited research shows an existing gap in the knowledge of agricultural literacy among individuals, specifically in poultry online programs.
The Present Study

The purpose of this study was to develop, pilot test, and evaluate the curriculum of a hybrid-online version of the existing Hands-on Hatch-out Program curriculum for elementary-age students. In preparation for this project, a situation analysis was conducted with elementary teachers in a local public school to determine their interest in an online version of the Hands-on Hatch-out Program.

Survey of Teachers’ Perceptions of Hands-on Hatch-out Program Curriculum

In July 2020, this researcher invited teachers at a local elementary school to participate in a study (Appendix A) to assess teachers’ perceptions of the Hands-on Hatch-out Program curriculum, technology within their classrooms, as well as other factors to consider when developing an online version of the Hatch-out Program. A request was submitted to the MSU Institutional Review Board (IRB) for approval. IRB determined the study was non-human subjects research and did not require IRB oversight (Appendix B). The survey (Appendix C) was emailed to 70 teachers that had previously utilized the Hands-on Hatch-out Program. Out of 70 teachers, a total of 23 responses were collected. According to the survey, 91.3% of teachers felt their students were extremely satisfied with the program, while 4.35% of teachers found the curriculum to be somewhat difficult for the students. Many teachers expressed that they liked the hands-on application of the program most, while others enjoyed watching the chick’s hatch.

When asked “What did you dislike about this program?”, most replied there was nothing they would change. However, others (who have utilized the program for an extended amount of time) described the enjoyment of having the program for 21 days rather than a week, as well as “We were only able to keep the incubator for 1 week,” expressing interest in a longer program. A lack of instructions on how to implement the program was a concern expressed throughout the
responses. Of 23 teachers surveyed, 20 teachers agreed they were willing to participate in the Hybrid-Online Hatch-out Program; however, concerns for the lack of hands-on application were communicated.

An assortment of technological resources was available in classrooms according to the survey results. However, only 17.39% reported having individual computers or tablets assigned to each student. All teachers reported having Internet, but 31.82% were not allowed to download software onto classroom devices. However, most could have software downloaded after school district approval and assistance from the district technology staff. Nearly half (44.44%) could commit to one week of online application while others could commit to two to four weeks of online application. While concerns related to the implementation of an online program were expressed through the survey, the majority of teachers agreed they would accept an online version of the Hands-on Hatch-out Program. Results of this situation analysis were used to inform development of the curriculum in the present study. For example, special attention was given to making the online version as close to the hands-on version as possible and ensuring instructions were detailed so teacher could effectively implement the program.
CHAPTER III
RESEARCH DESIGN AND METHODOLOGY

Curriculum Development

The Hands-on Hatch-out Program curriculum was the basis for the development of the Hybrid-Online Hatch-out Program curriculum. Invitations were sent to teachers via the Canvas (Canvas Instructure, 2019) online system after communication via email regarding the process and steps needed to implement the program were provided. To aid teachers in Canvas operations and better understanding of the program topics, the Teacher Orientation Module was designed with options of a guided voice-over PowerPoint as well as a PowerPoint slides with no voice-over option (Appendix D). Current Hands-on Hatch-out Program lessons guided the hybrid-online version development. Videos were created to supplement the live hatch of chicks within the classroom, and activities were altered to account for time and lesson alterations. Surveys were created to assess learner knowledge gained as well as evaluate the program through teacher surveys. All surveys and tests were available within the Canvas course. The curriculum development process is described in more detail in Chapter IV.

Curriculum Implementation and Program Participants

Before the study, all intentions for the study with documentation were submitted to the MSU Institutional Review Board (IRB) for approval. IRB determined the study was non-human subjects research and did not require IRB oversight (Appendix E). After IRB’s review and decision, an email (Appendix F) explaining the study and requesting permission to implement
the program in classrooms was sent to the principals at Sudduth Elementary School and
Ackerman Elementary School. After permission was granted by the principals, Canvas course
invitations and emails (Appendix G) detailing the intent of the program were sent to each of the
first grade teachers at Sudduth Elementary School in the Starkville Oktibbeha County School
District as well as pre-kindergarten, kindergarten, and first grade teachers at Ackerman
Elementary School in the Choctaw County School District. This convenience sample was
utilized due to the ease of accessibility and teachers’ willingness to implement the program
within their classrooms.

Overall, a total of 5 teachers from Sudduth Elementary participated in the study, and a
total of 9 teachers and 172 students from Ackerman Elementary participated in the study.
Student numbers at Sudduth Elementary could not be determined due to teacher nonresponse to
that specific request.

Curriculum Evaluation

The RE-AIM framework (Re-aim, 2021) guided the evaluation of the Hybrid-Online
Hatch-out Program. Multiple questionnaires were developed for the evaluation process. A one-
group pretest-posttest design was used to assess outcomes, while a post-only design was used to
assess process. All questionnaires were completed via Qualtrics, an online survey system
(Qualtrics, 2021). The research questions in this study included:

Reach

1. How many students participated in the program?

Adoption

2. How many teachers implemented the program?

Effectiveness
3. What prior knowledge of poultry and agriculture did elementary student participants possess before program implementation?
4. Did participating elementary students gain knowledge of poultry after the program?
5. Did participating teachers’ perceptions and knowledge of agriculture change as a result of the program?

Implementation

6. What are participating elementary students’ perceptions of the program?
7. What are the participating teachers’ perceptions of the program?
8. How feasible was implementation of the program?

Maintenance

9. How many teachers are likely to implement the program again?

**Data Collection Tools and Procedures**

**Reach, Adoption, Implementation, and Maintenance - Process Evaluation**

As mentioned, 14 teachers implemented the Hybrid-Online Hatch-out Program (Adoption). The number of students in each classroom (Reach) was requested of teachers within the initial email with the details outlining the program. Some teachers provided this information, while others did not. The Implementation dimension of RE-AIM addressed dosage, satisfaction, and fidelity as described below through individual module surveys and pre- and post-surveys. Each survey completed by teachers contained an item for them to enter their classroom identifier (given to them in the initial email sent to teachers introducing the program as a whole and proper steps to take when completing each module in Canvas).
Module Surveys

A survey was created for completion by teachers after the module’s implementation. Each module survey (Appendix H) contained 21 questions overall so teachers could provide feedback that would provide understanding of the various process evaluation components to inform future implementation of the program. To identify dosage delivered and received, teachers were asked in one question to report how much of the module was completed (all, some, none) on each of the module surveys. To identify satisfaction with the program modules, four questions measured on a five-point scale from “Very” to “Not at all” on each module survey assessed student engagement in the lesson as well as interest in the videos. Teachers also asked students to raise their hand if they enjoyed the module (after each module) and reported the number of raised hands on each module survey to document student interest in each of the modules. Teachers’ satisfaction with the module overall was addressed through a single question with “Yes” or “No” response options, and one open-ended question asked teachers to provide any additional information that they needed to enhance implementation.

To assess fidelity, teachers were asked a variety of questions (nine questions per module). Teachers were asked to identify any level of difficulty in implementation on a five-point scale from “Very easy” to “Very difficult,” level of knowledge of the module components on a five-point scale from “Excellent” to “Terrible,” issues with PowerPoint (lesson) or activity, and any changes needed to the PowerPoint (lesson) and/or activity. A total of five open-ended questions were provided for teachers to describe issues, needed changes, and additional information teachers may have needed while implementing each of the modules. Teachers’ perceptions of the level of difficulty of students understanding of the module components were measured on a five-point scale from “Very easy” to “Very difficult” as well as the effectiveness of the activity on a
five-point scale from “Very” to “Not at all” were included in the assessment. One question in
each module survey assessed quality of the videos on a five-point scale from “Excellent” to
“Terrible” to ensure there were no issues with that component of the modules.

**Teacher Pre-Survey**

The Teacher Pre-Survey (Appendix I) contained a total of 13 questions for completion prior to completing an initial Teacher Orientation module. Among the 13 questions, teachers were asked to enter their classroom identifier, indicate the grade they teach, the school at which they teach, and whether they had utilized the Hands-on Hatch-Out Program previously in their classroom. They were also asked to report their comfort level for teaching using an online platform on a five-point scale from “Extremely comfortable” to “Not at all comfortable.” Seventeen additional agriculture and knowledge questions were included (see Effectiveness – Outcome Evaluation) and measured on a five-point scale from “Poor” to “Excellent.”

**Teacher Orientation Post-Survey**

The Teacher Orientation Post-Survey (Appendix J) assessed satisfaction with the instructional video (one question) and comfort level related to teaching each of the topics covered in the curriculum (15 questions) on a five-point scale from “Not at all” to “Extremely,” as well as one “Yes” or “No” question addressing overall satisfaction with the module. Ten questions measured knowledge gained through the orientation module directly related to topics taught in the program (see Effectiveness – Outcome Evaluation) on a five-point scale from “Poor” to “Excellent.”
Teacher Post-Survey

The Teacher Post-Survey (Appendix K) was completed after all five modules were implemented. The survey contained a total of 12 questions including two open-ended questions. Teachers were asked to indicate their perception of grade-level appropriateness of the overall program. Perceived difficulty level of the implementation on a five-point scale from “Very easy to Very difficult” and satisfaction with the different components of the modules as well as the program overall were assessed on a five-point scale from “Very satisfied to Very dissatisfied.” Effectiveness of the introduction video for implementation of the program was documented, while one open-ended question asked teachers to provide any additional information that would be helpful in future implementation. Identifying any issues with the technology of the program, and an open-ended question addressing the issues was included in the Teacher Post-Survey. Three questions assessed teachers’ likelihood of implementing the program in the future, recommending the program to other teachers, or using the knowledge that was gained outside of the classroom on a five-point scale from “Extremely likely” to “Extremely unlikely.”

Effectiveness - Outcome Evaluation

A pre-test (Appendix L) was developed to be administered to elementary student participants prior to program implementation to evaluate each student’s current knowledge. Immediately following completion of the program, a post-test (Appendix M) was administered to determine knowledge after completion of the program. There was a total of ten questions to assess the learner’s knowledge. Questions #1-9 were multiple choice or select-all-that-apply items, while Question #10 asked students to draw a picture. Questions within the pre- and post-tests assessed the students’ knowledge of stages of chick development, biosecurity issues, basic needs of a chick, and the poultry industry. Question #2 and Question #3 were both select-all-that-
apply with four choices each. Therefore, a total of 14 answers were analyzed using Statistical Package for Social Sciences (SPSS; IBM Corp., 2020) to identify knowledge change in participating students from pre- to post-assessment. Question #10 was not examined in this study. The pre and post-test are identical to allow for a comparison of the two tests to determine the participants’ change in knowledge as a result of the program.

As mentioned, the Teacher Pre-Survey (Appendix I) assessed teachers’ knowledge and perceptions of agriculture and poultry. Specifically, knowledge of ten topics covered within the program was assessed. An additional seven questions documented teachers’ general knowledge of poultry and agriculture prior to the program.

The Teacher Orientation Post-Survey (Appendix J) and the Teacher Post-Survey (Appendix K) both included ten items to assess knowledge of topics covered within the program. The ten knowledge items on both post-surveys were identical to the items on the pre-survey; however, the seven general knowledge items were not included on either teacher post-survey, as the specific content was not covered in the program curriculum.

**Data Analysis**

After participating students and teachers finished the program, data were downloaded from Qualtrics. A report was generated in Qualtrics for each of the teacher surveys. All questionnaires were downloaded to Microsoft Word, Microsoft Excel, as well as Microsoft PowerPoint to determine the most effective source to review the data. Ultimately, Microsoft PowerPoint report was utilized to review the data from teacher surveys due to preference in presentation of the data. Components of the module surveys were organized into tables. Responses to open-ended questions were examined and grouped into common themes.
Student pre and post-test data were exported and transferred into a SPSS Statistics Data File Format (.sav). Any students that were unable to take both the pre- and post-test were removed from the data analysis. Students’ pre- and post-tests were matched and correct and incorrect answers for pre- and post-tests were coded as 1 for correct and 0 for incorrect. A total knowledge score was computed by adding the number of items answered correctly. A paired $t$-test was utilized to determine the significance of the change in students’ knowledge from pre- to post-test.
CHAPTER IV
RESULTS

Introduction

As a nonformal education program, the Hybrid Online Poultry Hatch-out Program involves a combination of activities: conducting a needs assessment/situational analysis, setting priorities, developing a program plan, marketing and recruiting, implementing lessons, evaluating outcomes, and reporting (Israel et al., 2011). This chapter presents details and results of the curriculum’s development, pilot test, and evaluation. The research questions, based on the RE-AIM framework (Re-aim, 2021) will be addressed in the curriculum implementation and evaluation results. According to Rossi et al. (2019), process evaluation seeks to identify the quality of the program content and the implementation of the program, while outcome evaluation assesses participant knowledge or other participant outcomes/results. Research questions 1-2 and 6-9 address the Reach, Adoption, Implementation, and Maintenance dimensions of RE-AIM (process evaluation). Research questions 2-5 address the Effectiveness dimension of RE-AIM (outcome evaluation). Through this study, only short-term outcomes, such as the participating students’ knowledge change from before to after the program, were assessed.

Curriculum Development

As mentioned, existing content of the Hands-on Poultry Hatch-out Program provided the starting point for development of the Hybrid-Online Poultry Hatch-out Program. The curriculum was designed to incorporate a mixture of both online curriculum and hands-on activities. Overall,
each module included daily learning objectives and instructions to guide teachers through the day’s modules.

The first step in curriculum development involved dividing the original Hands-on Hatch-out Program PowerPoint into multiple presentations to accommodate the modules’ organization; thus, daily PowerPoint presentations guided each module’s lesson. Step-by-step instructions were provided for the daily activities that aligned with each module lesson. Videos were included as a substitute the live hatch in the classroom as well as to aid in learner knowledge of the various topics. Specific module content is described next (see Appendix N).

- **Teacher Orientation Module:**
  - Guided voice-over PowerPoint lecture and PowerPoint with no voice over lecture (Appendix D): Consisted of step-by-step instructional materials on how to access, navigate, and manage each of the five learning modules in the Canvas course as well as an overview of poultry and the industry to aid in learner outcomes.

- **Module 1 (Day 1):** This lesson focused on chick development and prepared students for the hatching video developed by the MSU Poultry Science Department.
  - **PowerPoint:** Students were guided through the incubation process and the different stages of chick development.
  - **Video:** The video utilized within the module focused on embryo development and stages.
• **Activity:** Consisted of a chick hatching activity in which students pieced two portions of a paper egg together and glued it to a popsicle stick that moved up and down to show a chick “hatching.”

• **Module 2 (Day 2):** This lesson explains the critical steps needed to care for chicks after they hatch.
  - **PowerPoint:** Students were given details on responsibilities of raising chicks.
  - **Video:** The Hatch Video was created by the MSU Poultry Science Department and included steps on how to incubate eggs, candling of eggs to document different stages of development throughout the 21 days, chick hatching, as well as chicks after hatch.
  - **Activity:** Explained the “story” or life cycle of a chick hatching from an egg using two paper plates and a chicken life cycle printout.

• **Module 3 (Day 3):** A critical piece of information needed after chicks are born is not only how to care for them, but how to keep them safe. This lesson explains biosecurity measures and the importance of biosecurity in the poultry industry.
  - **PowerPoint:** Students were given details of biosecurity measures and the importance of taking precautions to keep their chicks safe.
  - **Video:** MSUES video on biosecurity allowed students to see live footage of the contents described in Module 3 PowerPoint presentation. After hatch of the chicks in the Hands-on Hatch-out Program, students can see and play with the chicks daily until the end of the week. To ensure students could see the chicks daily after the initial Hatch Video, a Chicks
Video of chicks playing in an aquarium was created by the MSU Poultry Science Department.

- **Activity:** Provided further insight into how germs transfer by mixing different glitter colors into different sand cups and continue mixing in different cups with different glitter colors until they have an assortment of colors.

- **Module 4 (Day 4):** Throughout the week, educational content focuses on how to hatch a chick and the proper measures to care for chick and keep it safe. Module 4 (Day 4) explains why all of this is important (the poultry industry).
  - **PowerPoint:** Aimed to increase knowledge about Mississippi’s poultry industry while discussing what products come from chickens, how different birds are used for different grocery store products (meat and eggs), as well as job opportunities within the industry.
  - **Video:** To ensure students were given their daily dose of chicks, MSU Poultry Science Department’s Chick Video was included as a conclusion of the lesson.
  - **Activity:** Allowed students to decide between proper and improper items that a farmer, nutritionist, teacher, or veterinarian would utilize to build a poultry farm that has safe and healthy chickens.

- **Module 5 (Day 5):** To conclude the week, Module 5 (Day 5) provided an overview of the main points from the week’s daily lessons.
  - **PowerPoint:** Provided a review of the educational information.
o **Video:** Included students’ daily dose of chick interaction with the MSU Poultry Science Department’s Chick Video.

o **Activity:** Allowed students to leave with their own chick to take home with the creation of a chick made from egg cartons.

After module content was revised or created, attention turned to developing the evaluation tools. The existing Student Pre-Test (Appendix L) and Student Post-Test (Appendix M) were reviewed to ensure the questions adequately assessed the key educational content in each model. The student pre- and post-tests contained the same questions to allow for a comparison of learner knowledge. Additional evaluation tools were then developed. A Teacher Pre-Survey (Appendix I) was developed to assess teacher knowledge of and comfort levels when teaching poultry and agriculture prior to implementing the program. A Teacher Orientation Module Post-Survey (Appendix J) was also developed to evaluate the satisfaction and effectiveness of the Teacher Orientation Module. A Teacher Post-Survey was developed for each of the individual modules so that teachers could provide feedback on the content and implementation of the specific module (Appendix H). A final Teacher Post-Survey (Appendix K) was developed for completion after all five modules of the curriculum to evaluate the program as a whole. Feedback provided through teacher surveys was critical to determine program effectiveness, and teachers were explained the degree of importance to answering all module surveys to the best of their ability. After all evaluation surveys were developed, they moved into Qualtrics so they could be completed online by students and teachers.

The program was considered a hybrid online program because portions of the curriculum were presented online, while the teachers talked through each of the modules, and the activities were hands-on with real materials in the classroom. Materials for all activities (e.g., sand, glitter,
handouts, items for the farm activity, paper plates, feathers, egg cartons, etc.) were divided into activity kits (one kit for each of the activities) with materials for each student placed in a large overall kit for each classroom. The activity kits were delivered to the participating schools on the first morning of the program. Remaining materials that had not been used and were re-usable were collected from the schools on the Monday after the program ended.

Each component of the program was critical to the program overall to aid in learner knowledge. All efforts were made to ensure teachers understood the program and components to aid in program effectiveness. Careful consideration was taken in the consistency of the organization and flow of the modules. Although not all videos were not originally created for this study, the additional videos utilized were considered essential to aid in learner knowledge. To ensure authenticity, creation of videos for the program was taken into consideration in the development of the program. After development of the program and review to ensure all content was included as well as proper guidance for teachers, the implementation stages began.

**Curriculum Pilot Test**

After the Hybrid-Online Hatch-out Program curriculum was developed, it was implemented in classrooms. Process evaluation corresponds to program implementation (Rossi et al., 2019); therefore, results related to the Reach, Adoption, Implementation, and Maintenance dimensions of RE-AIM and the corresponding research questions are presented in this section along with details of the pilot test.

The Hybrid-Online Hatch-out Program was implemented at Sudduth Elementary School in April and May 2021 and at Ackerman Elementary School in May 2021. Different teachers implemented the 5-day program during different weeks in this time frame. However, all lessons were presented from Monday through Friday of the same week.
Although guidance on how to access the Canvas course and instructions on where to begin within the course were provided to teachers through email the week before the program was scheduled to begin in each school, during the first implementation stage, a large majority of Sudduth Elementary teachers were unwilling to adopt the program. Unfortunately, the exact reasoning could not be determined through process evaluation; however, after assessing the communication from teachers, approach and timing seemed to be issues with implementation at Sudduth Elementary. Therefore, due to the low acceptance from Sudduth Elementary, extra training opportunities were offered to Ackerman Elementary teachers either via face-to-face or Zoom meetings. No teachers from Ackerman Elementary requested the additional training hours, but they were available if needed. Wording within the initial email to Ackerman Elementary teachers was also altered to indicate an optional approach versus the more required approach that was delivered to Sudduth Elementary teachers. All daily instructions for each of the modules were included within the Canvas course; however, a description of the Teacher Orientation Module and its value to the teacher was explained within the email. On Monday morning of the week that the program began, all supplies for activities were delivered to the participating school.

Prior to the implementing Module 1 (day 1 of the program), teachers were able to review the Teacher Orientation Module. Before reviewing the module, they were asked to complete the Teacher Pre-Survey to document their knowledge of and comfort levels when teaching poultry and agriculture. Teacher Orientation PowerPoint was approximately 30 minutes long, and the Teacher Orientation Module took approximately 45 minutes to an hour to complete. After completion of the Orientation Module, teachers were asked to complete the Teacher Orientation Module Post-Survey to provide feedback on their satisfaction with and perceived effectiveness of the Orientation Module.
On a Monday, prior to beginning the Module 1 (Day 1) lesson on chick development, teachers were asked to test student knowledge before the program with the Student Pre-Test. Unique identification numbers were used for each classroom as well as each student to enable matching across completed evaluation tools. Module 1 could then be implemented. The length of Module 1 (PowerPoint, video, activity) was approximately 45 minutes. Teachers were asked to complete the Module 1 Teacher Post-Survey after the lesson was finished.

On a Tuesday, teachers could implement Module 2 (Day 2) which explains the critical steps needed to care for chicks after they hatch. The length of Module 2 (PowerPoint, video, activity) was approximately 30 minutes. Teachers were asked to complete the Module 2 Teacher Post-Survey after the lesson was finished.

On a Wednesday, Module 3 on biosecurity measures and the importance of taking precautions could be implemented. The length of Module 3 (PowerPoint, video, activity) was approximately 30 minutes. Upon module completion, teachers were asked to complete the contents through the Module 3 Teacher Post-Survey.

On a Thursday, Module 4 could be implemented to present information on Mississippi’s poultry industry, its products, and job opportunities. The length of Module 4 (PowerPoint, video, activity) was approximately 45 minutes. Upon completion of the Module 4 components, teachers were asked to evaluate the contents in the Module 4 Teacher Post-Survey.

On Friday, to conclude the week, Module 5 (Day 5) provided an overview of the main points from the week’s daily lessons. The length of Module 5 (PowerPoint, video, activity) was approximately 25 minutes. Upon completion of the Module 5 (and thus the overall program), students completed the Student Post-Test with the same questions asked in the Student Pre-Test.
to evaluate/compare learner knowledge. Teachers were asked to complete the Module 5 Teacher Post-Survey as well as a Teacher Post-Survey to provide feedback on the program as a whole.

Unfortunately, teachers did not consistently enter their classroom identification number at either Sudduth nor Ackerman Elementary, so surveys could not be matched across teachers; however, each teacher was provided a Pre-Survey, Teacher Orientation Post-Survey, Module 1-5 surveys, and a (overall program) Post-Survey. Each student was provided a Pre-Test prior to program implementation and a Post-Test after completion of the program. Many surveys were not accessed and answered while some remained incomplete. Teachers were inconsistent when answering the questions on the surveys; therefore, throughout this chapter, the sample size is identified for each topic.

**Reach and Adoption**

**Research Question 1: How many students participated in the program?**

**Research Question 2: How many teachers implemented the program?**

The first stage in the implementation of the Hybrid Online Hatch-out Program included Sudduth Elementary School first grade classrooms in the Starkville Consolidated School District. There are a total of 17 classrooms in the Sudduth first grade. Two of the Sudduth first grade teachers opted out of implementation of the program within their classrooms. Although proper steps were taken to begin the implementation of the program, due to unforeseen circumstances (school testing, workload, etc.), Table 1 shows five teachers began the program; however, very few followed the program through to completion. While the total number of students in each of the classrooms was requested, this information was not provided by any of the teachers. Because 215 students did the pre-test, we know at least 215 students were exposed to some portion of the program.
The second stage in the implementation of the Hybrid Online Hatch-out Program included Pre-K, Kindergarten, and first grade classrooms at Ackerman Elementary School in the Choctaw County School District. Although the program was developed for the first grade population, Pre-K and Kindergarten classrooms at Ackerman Elementary School were interested in the program as well, and since this was a pilot test, these younger grades were invited to participate. The two Pre-K classrooms included a total of 20 students each as shown in Table 1. In the four Kindergarten classrooms, a total of 63 students participated, and a total of three first grade classrooms with 69 students participated in the program.

### Table 1

*Number of Participating Teachers (Adoption) and Students (Reach)*

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>Number of Participating Teachers (Adoption)</th>
<th>Number of Participating Students (Reach)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ackerman Elementary</td>
<td>Pre-K</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Ackerman Elementary</td>
<td>K</td>
<td>4</td>
<td>63</td>
</tr>
<tr>
<td>Ackerman Elementary</td>
<td>1st</td>
<td>3</td>
<td>69</td>
</tr>
<tr>
<td>Sudduth Elementary</td>
<td>1st</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>14</strong></td>
<td><strong>172</strong></td>
</tr>
</tbody>
</table>
Effectiveness

Research Question 3: What prior knowledge of poultry did elementary student participants possess before program implementation?

Research Question 4: Did participating elementary students gain knowledge of poultry after the program?

Pre- and post-tests were used to evaluate elementary student participants’ knowledge of poultry prior to, and knowledge gained after program completion – one component of the Effectiveness dimension (outcome evaluation). A total of 125 students \( (n=125) \) completed both the pre- and post-test; only those students with a matched pre- and post-test were used for this analysis. Table 2 displays the percentage of correct pre- and post-responses to nine of the ten test questions asked. Question 2: “Choose everything that comes from chickens” and Question 3: “What is a job you can do in the Poultry Industry?” were both check all that apply questions; therefore, each answer for those two questions was examined individually for change.

Table 2

Correct Pre- and Post-test Responses Showing Student Knowledge at Pre- and Post-test

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct Pre-test</th>
<th>Correct Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n (%) )</td>
<td>( n (%) )</td>
</tr>
<tr>
<td>Q1. Which is a broiler?</td>
<td>48 (38.4%)</td>
<td>113 (90.4%)</td>
</tr>
<tr>
<td>Q2. Choose everything that comes from chickens.</td>
<td>112 (89.6%)</td>
<td>119 (95.2%)</td>
</tr>
<tr>
<td>(Answer 1 – egg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2. Choose everything that comes from chickens.</td>
<td>68 (54.4%)</td>
<td>116 (92.8%)</td>
</tr>
<tr>
<td>(Answer 2 – chicken nuggets)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 (continued)

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct Pre-test</th>
<th>Correct Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n ) (%)</td>
<td>( n ) (%)</td>
</tr>
<tr>
<td>Q2. Choose everything that comes from chickens.</td>
<td>116 (92.8%)</td>
<td>122 (97.6%)</td>
</tr>
<tr>
<td>(Answer 3 - hamburger)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2. Choose everything that comes from chickens.</td>
<td>99 (79.2%)</td>
<td>113 (90.4%)</td>
</tr>
<tr>
<td>(Answer 4 – chicken leg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry?</td>
<td>36 (28.8%)</td>
<td>100 (80.0%)</td>
</tr>
<tr>
<td>(Answer 1 – veterinarian)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry?</td>
<td>24 (19.2%)</td>
<td>89 (71.2%)</td>
</tr>
<tr>
<td>(Answer 2 - nutritionist)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry?</td>
<td>90 (72.0%)</td>
<td>110 (88.0%)</td>
</tr>
<tr>
<td>(Answer 3 - farmer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry?</td>
<td>20 (16.0%)</td>
<td>80 (64.0%)</td>
</tr>
<tr>
<td>(Answer 4 - teacher)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4. What day does a chick hatch?</td>
<td>41 (32.8%)</td>
<td>116 (92.8%)</td>
</tr>
<tr>
<td>Q5. Which is an example of good biosecurity?</td>
<td>115 (92.0%)</td>
<td>125 (100.0%)</td>
</tr>
<tr>
<td>Q6. Can a baby chick keep itself warm?</td>
<td>79 (63.2%)</td>
<td>116 (92.8%)</td>
</tr>
<tr>
<td>Q7. Which bird produces eggs for us to eat?</td>
<td>59 (47.2%)</td>
<td>110 (88.0%)</td>
</tr>
<tr>
<td>Q8. In the poultry industry, do meat and egg birds live together?</td>
<td>92 (73.6%)</td>
<td>119 (95.2%)</td>
</tr>
<tr>
<td>Q9. Do chickens have teeth?</td>
<td>112 (89.6%)</td>
<td>117 (93.6%)</td>
</tr>
</tbody>
</table>
To determine if knowledge change from pre to post among student participants was statistically significant, paired *t*-tests were conducted (see Table 3). There was a significant change in the total overall scores of students from pre-test (*M*=8.8880, *SD*=1.65693) to post-test (*M*=13.3200, *SD*=2.20191); *t*(124)=-21.275, *p*= 0.0001. Additionally, Table 3 shows that there was a significant change in student participants’ knowledge on 14 out of 15 questions aimed to assess learner knowledge prior to and after program implementation. The three most significantly changed student responses to questions were for Question 1, Question 3 (Answer 1), and Question 4.

Table 3

<table>
<thead>
<tr>
<th>Question</th>
<th>Student Pre-Test</th>
<th>Student Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>M</em></td>
<td><em>SD</em></td>
</tr>
<tr>
<td>Q1. Which is a broiler?</td>
<td>.3840</td>
<td>.48832</td>
</tr>
<tr>
<td>Q2. Choose everything that</td>
<td>.8960</td>
<td>.30649</td>
</tr>
<tr>
<td>comes from chickens. (Answer 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2. Choose everything that</td>
<td>.5440</td>
<td>.50006</td>
</tr>
<tr>
<td>comes from chickens. (Answer 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2. Choose everything that</td>
<td>.9280</td>
<td>.25953</td>
</tr>
<tr>
<td>comes from chickens. (Answer 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2. Choose everything that</td>
<td>.7920</td>
<td>.40751</td>
</tr>
<tr>
<td>comes from chickens. (Answer 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Student Pre-Test</td>
<td>Student Post-Test</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry? (Answer 1)</td>
<td>.2880</td>
<td>.45465</td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry? (Answer 2)</td>
<td>.1920</td>
<td>.39546</td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry? (Answer 3)</td>
<td>.7200</td>
<td>.45081</td>
</tr>
<tr>
<td>Q3. What is a job you can do in the Poultry Industry? (Answer 4)</td>
<td>.1600</td>
<td>.36808</td>
</tr>
<tr>
<td>Q4. What day does a chick hatch?</td>
<td>.3280</td>
<td>.47137</td>
</tr>
<tr>
<td>Q5. Which is an example of good biosecurity?</td>
<td>.9200</td>
<td>.27238</td>
</tr>
<tr>
<td>Q6. Can a baby chick keep itself warm?</td>
<td>.6320</td>
<td>.48420</td>
</tr>
<tr>
<td>Q7. Which bird produces eggs for us to eat?</td>
<td>.4720</td>
<td>.50122</td>
</tr>
<tr>
<td>Q8. In the poultry industry, do meat and egg birds live together?</td>
<td>.7360</td>
<td>.44257</td>
</tr>
<tr>
<td>Q9. Do chickens have teeth?</td>
<td>.8960</td>
<td>.30649</td>
</tr>
<tr>
<td>Total Score</td>
<td>8.8880</td>
<td>1.65693</td>
</tr>
</tbody>
</table>

*p ≤ .05, **p ≤ .01, ***p ≤ .001
Research Question 5: Did participating teachers’ perceptions and knowledge of agriculture change as a result of the program?

Teachers’ perceived knowledge change was also assessed as a component of the Effectiveness dimension (outcome evaluation). As shown in Figure 1, when asked to indicate their level of knowledge in agriculture prior to program implementation ($n=16$), 37% of teachers indicated they had an average level of knowledge in agriculture, and 44% indicated they had poor or fair knowledge of agriculture. Only 19% of teachers indicated having a good level of knowledge in agriculture. After program implementation, 72% of teachers ($n=7$) indicated they had a good knowledge level in agriculture.

![Figure 1. Teacher Change in Knowledge in Agriculture from Pre- to Post-Survey](image)

As shown in Figure 2, 44% of teachers ($n=16$) expressed having an average knowledge level in poultry prior to program implementation. Over 50% of teachers felt they had either poor or fair knowledge levels prior to program implementation. After the program was completed, 71% of teachers ($n=7$) expressed having a good knowledge level of poultry.
Teachers were evaluated on their level of knowledge in agriculture in general prior to program implementation and then again after program completion. As shown in Figure 3, a large percentage (38%) of teachers expressed having an average level of knowledge of agriculture in general with only 19% having a good level of knowledge. After program implementation, nearly three-fourths (71%) had a good level of knowledge of agriculture, while 14% reported very good knowledge.
Teachers were also evaluated on their level of knowledge in poultry specifically prior to and again after program implementation. Figure 4 shows nearly half of teachers (44%) had an average level of knowledge in poultry prior to program implementation. After teachers completed the program, 71% expressed having a good level of knowledge of poultry, while 14% expressed having a very good level of knowledge in the topic.

Figure 3. Teacher Level of Knowledge of Agriculture in General Prior to Program Implementation Compared to Teacher Level of Knowledge of Agriculture After Program Implementation
Prior to program implementation, teachers were evaluated on their level of knowledge of some of the topics covered in the Hybrid Online Hatch-out Program related to agriculture and poultry (caring for chicks, chick development, and biosecurity). Figure 5 shows at least three-fourths of teachers reported an average, fair, or poor level of knowledge of the topics. None of the teachers reported an excellent level of knowledge of any of the topics; however, 25% had a good knowledge level of the responsibilities of caring for chicks, and 50% had an average level of knowledge in the developmental stages of a chick. Teachers expressed having a poor knowledge level in biosecurity in agriculture (56%), and an even greater percentage (63%) expressed having a poor knowledge level in poultry biosecurity.
Figure 6 provides data on the knowledge level of the remaining topics covered in the curriculum related to poultry (e.g., poultry industry, bird differences, products, and job opportunities) prior to program implementation. An equal percentage (38%) of teachers felt they had poor and fair level of knowledge of the poultry industry prior to program implementation, while 69% of teachers expressed having a poor knowledge level when differentiating between meat and layer birds. Half of the teachers (50%) believed they had an understanding of what products come from chickens, but only 6% had an average understanding of the job opportunities available in the poultry industry.
The Teacher Orientation Module was developed as a guidance to teachers on how to navigate within the Canvas course as well as an educational foundation of the topics that would be discussed throughout the program. To assess teachers' comfort level when teaching the various topics and activities, questions were asked in the Teacher Orientation Module Post-Survey. As shown in Figure 7, teachers were moderately to very comfortable when explaining, identifying, and instructing the varying topics after their completion of the Teacher Orientation Module.
Figure 7. Teacher Comfort Level When Teaching Various Topics and Activities After the Teacher Orientation Module

Comfort levels identified by teachers for varying topics shown in Figure 8 indicate teachers have a moderately (no less than 44%) to very (no greater than 50%) comfort level when explaining or instructing students after the Teacher Orientation Module. Some teachers (20%) identified they were extremely comfortable when explaining the difference in meat and layer birds.
As shown in Figure 9, teachers’ comfort levels were consistent across all topics with the exception of the job opportunities and chick activities and the overview/recap presentation. Teachers indicated having a slight (11%) comfort level as well as no (11%) comfort level in instructing students on how to complete the job opportunities activity. Similar levels of comfort were identified when instructing students on how to complete the chick activity as well as providing an overview/recap of information from all lessons.
Again, after completing each individual student lesson module, teachers were asked to indicate their level of knowledge on each of the topics covered in the curriculum. As shown in Figure 10 and Figure 11, the majority of teachers felt as though their level of knowledge of the varying topics of the program was excellent or good after module completion. After Module 1, most teachers indicated good (45%) knowledge of chick development. Although there were no chicks to care for in the classroom, teachers felt as though they had a good (55%) knowledge level in responsibilities for caring for chicks after Module 2. The Module 3 Biosecurity in Poultry lesson left teachers feeling as though they had excellent (67%) knowledge of the topic. Module 4 covered an extensive amount of information regarding the poultry industry, including career opportunities within the industry. Half (50%) of teachers reported excellent knowledge of
the poultry industry, while 30% expressed an average level of knowledge of the topic after completing the module with their students.

![Figure 10. Teacher Knowledge Level of Various Topics Related to Poultry after Module Completion](image)

An equal percentage of teachers felt as though they had excellent (50%) knowledge of the difference in meat and layer birds as the poultry industry indicated in Figure 11. Teachers who indicated an excellent level of knowledge in the different products that come from chickens was greater (70%) than for any other topic. However, 60% of teachers also expressed having excellent knowledge of the job opportunities available within the poultry industry. Module 5’s lesson on the overview/recap of all the lessons left only 45% of teachers expressing excellent knowledge after completion, but a large percentage of teachers felt they had a good (36%) level of knowledge of the overview/recap.
Implementation

Research Question 6: What are participating elementary students’ perceptions of the program?

After completion of each module, teachers were asked to complete a survey to evaluate the process and outcomes of the specific module. The Implementation dimension of RE-AIM focuses on process. To assess participating students’ perceptions of the program (process evaluation component of satisfaction), various questions were asked of teachers. Figure 12 presents teachers’ perceptions of how engaging the PowerPoint (lesson) was to students for each of the 5 modules, while Figure 13 presents teachers’ perceptions of students’ interest in the videos provided in each of the 5 modules.
According to the data in Figure 12, PowerPoint (lesson) for Modules 2-5 were perceived as either very or somewhat engaging to participants by at least 70% of the teachers. However, the Module 1 PowerPoint (lesson) was perceived as only a little to somewhat engaging to participants by 81% of the teachers.

![Bar Chart](image)

**Figure 12. Teacher Perceptions of Student Engagement with the PowerPoint (Lesson)**

Figure 13 indicates at least two-thirds of teachers perceived that their students were very interested in all module videos except for the video in Module 4. An equal percentage of teachers indicated that their students were somewhat or very interested in the videos presented in Module 4 of the program.
Research Question 7: What are the participating teachers’ perceptions of the program?

Evaluation of teachers’ perceptions of the program was collected through the Teacher Pre-survey, each module survey, and then again within the Teacher Post-survey. Satisfaction was an element of the process evaluation addressed by this research question. Figure 14 through Figure 19 show teachers’ responses to a variety of questions assessing their perceptions of the program.

Teachers’ comfort level of teaching through an online platform prior to program implementation was assessed in the pre-survey. Figure 14 shows that the majority of teachers felt moderately (44%) to somewhat (31%) comfortable in using an online platform prior to program implementation. A small percentage of teachers expressed they were either extremely comfortable or not at all comfortable in using an online platform.
After implementing each module, teachers responded to specific questions about module content: student engagement and interest (previously reported), quality of the videos, and effectiveness of the activity. As shown in Figure 15, all teachers felt the quality of the videos in each of the modules was good or excellent, with the majority of teachers reporting the quality of videos to be excellent.
Figure 15.  Teacher Perceptions of Video Quality

Figure 16 indicates at least half of the teachers perceived the module activities to be very effective. The Module 4 activity had the lowest perception of effectiveness, with an equal percentage (50%) of teachers somewhat or very effective.
Figure 16. Teacher Perceptions of Activity Effectiveness

Figure 17 through Figure 19 display teachers’ satisfaction with each of the modules, the overall program, and other specific elements. As shown in Figure 17, all teachers were satisfied overall with each of the modules.
Each module contained a variety of videos depending on the lesson, and a Teacher Orientation PowerPoint video was available to teachers in the teacher orientation module completed prior to program implementation. Figure 18 suggests teachers were somewhat to very satisfied with the different videos available in the different modules. Teachers were somewhat (57%) to very (43%) satisfied with the teacher orientation PowerPoint video. Included in the chick development module, the Poultry hub Australia Chicken Embryo Development video was provided to aid in understanding of chick development. Overall, teachers were very satisfied (57%) with the embryo development video. The Day 2 module included a video of the incubation process through hatch of the chick. Overall, teachers were mostly somewhat (57%) satisfied with the hatch video. Additionally, 57% of teachers were very satisfied with the biosecurity video in Module 3 that demonstrated proper steps to aid in biosecurity on a poultry
farm. Every day after the initial hatch video on day 2, each module included a chick video at the end of the day’s module. Teachers were somewhat (43%) or very (29%) satisfied with the chick video.

![Teacher Satisfaction with Individual Module Videos](image)

**Figure 18. Teacher Satisfaction with Individual Module Videos**

Finally, the Teacher Post-survey addressed questions regarding teacher satisfaction with the program overall as well as various design elements of the program. Figure 19 shows all teachers were somewhat (57%) or very (43%) satisfied with the program overall. Organization of the program as well as quality of the components of the program could impact program effectiveness and outcomes. Teachers were very satisfied (57%) with the organization of the program, while most were somewhat satisfied (71%) with the quality of the material.
Research Question 8: How feasible was implementation of the program?

Another component of the Implementation dimension of RE-AIM is feasibility of implementation in terms of dosage and fidelity. Therefore, as part of the process evaluation, feasibility of program implementation was assessed through items on the Teacher Pre-survey, each module survey, and the Teacher Post-survey. Figure 20 through Figure 30 and Table 4 show teachers’ responses to a variety of questions to evaluate the feasibility of implementation of the program.

Although level of completion could not be linked to the participants’ knowledge based on the findings due to the issue with classroom identifiers, Figure 20 shows that all teachers completed most or some of the modules, with the majority of teachers completing all (at least 70%) portions of the modules. Only one teacher (10%) was unable to complete Module 3.
To help prepare teachers to implement the program, an introduction video was available for viewing. As shown in Figure 21, nearly three-fourths (71%) of the teachers (n=7) indicated that the video was indeed helpful in their implementation of the program. When teachers were asked about any additional information needs that would be helpful, only one teacher responded with a request for “an approximation of time needed to complete the components of each module.”

Figure 20. Module Completion
Because this program used a hybrid approach, problems with technology could affect implementation. However, as shown in Figure 22, teachers that responded indicated there were no issues with technology when implementing the online portion of the curriculum.
Figure 22. **Teacher Perceptions of Issues with Technology in the Online Portion of the Curriculum**

Figure 23 displays teachers’ opinion on the level of difficulty in implementing the PowerPoint (lesson) for each of the modules. Although 20% of the teachers reported Module 4 was somewhat difficult overall, most of the teachers (at least 60%) indicated the PowerPoint (lesson) were very easy to implement.
Figure 23. Teacher Perceptions Regarding the Level of Difficulty in Implementing the Module PowerPoint (Lesson)

Figure 24 presents teachers’ feedback on issues that affected implementation of the PowerPoint (lesson). Of the teachers who responded to this item, only one indicated having issues (with Module 4).
If teachers reported an issue with the PowerPoint (lesson), an open-ended follow-up question allowed them to describe the issue. Curriculum level appropriateness seemed to be the issue with Module 4’s PowerPoint (lesson). The teacher’s response was “Some of the vocabulary used was over my kindergarteners head. I had to reword some of it so that they could understand what I was talking about.”

Teachers were asked if any changes were necessary for the PowerPoint (lesson) in each of the modules (see Figure 25). Overall, level of difficulty for the younger audiences was the biggest concern for teachers. One teacher reported, “Some of the vocabulary was too high for kindergarten students. I would simplify the information for this age group.” Another teacher provides similar feedback regarding PreK students: “The PowerPoint was a little hard for PreK.
It would be fine for a little older kids.” Having more interactive lessons for the age group was another piece of advice given by several teachers.

Figure 25.  
*Teacher Perceptions of Changes Needed within the Module PowerPoints (Lessons)*

Figure 26 displays the perceived level of difficulty in implementing the hands-on activity in each of the modules. Responses to this item were quite different across modules. While approximately 55% of teachers reported the activities in Modules 1-3 were somewhat or very easy to implement, less than half felt this way for Modules 4 (33%) and 5 (45%). Instead, approximately one-third of teachers perceived the activities in Modules 4 and 5 to be “just right.”
Figure 26. Teacher Perceptions Regarding the Level of Difficulty in Implementing the Hands-on Activity in Each Module

Figure 27 presents findings to the question asking about issues with the activity that affected implementation; the large majority of teachers (at least 80%) indicated there were no issues. Responses to the open-ended follow-up question included the following concerns. The activity for Module 1 was difficult to understand and above students’ level for one of the classrooms; however, it is unknown as to which grade level the teacher is referring. “Missing supplies to complete the module activity” and “difficulty attaching the feathers and eyes with glue sticks—had to staple the feathers on the egg cartons” were described as issues that teachers found with the activities for Modules 4 and 5.
Figure 27. **Teacher Perceptions of Issues with Module Activities that Affected Implementation**

Figure 28 displays responses to the question asking if changes were needed for the activity within each of the modules. The majority of teachers indicated that no changes were needed. However, for those that indicated changes were needed, responses to the follow-up open-ended question mentioned concerns about the level of difficulty and lack of materials were expressed. Comments such as “It was difficult trying to attach the feather and eyes with glue sticks. I had to staple the feathers on the egg carton.” and “The level was a little above their heads to fully comprehend” will aid with any modifications needed for the program activities.
Figure 28. *Teacher Perceptions of Changes Needed for the Module Activities*

Figure 29 presents teachers’ opinion on the level of difficulty in implementing the video for each of the modules. The majority of teachers (at least 73%) reported implementation of the videos was “very easy.”
Figure 29. Teacher Perceptions Regarding the Level of Difficulty in Implementing the Module Videos

While the program was developed for first graders, there was interest in determining whether it could be utilized in other grades. Therefore, teachers were asked if the curriculum was appropriate for the grade level in which they taught. Overall, teachers felt the program curriculum was slightly (43%) to very (29%) appropriate for the grade level in which they taught; however, with the missing classroom identifiers, the grade level cannot be connected to teacher responses.
Teachers were asked in each module survey if any additional information was needed to implement the module. Although few teachers requested additional information, Table 4 presents those teachers’ responses. Clarification of instructions for activities was mentioned for Modules 2 and 5. Additional materials on processing/packaging of the chicken meats and eggs was suggested to improve upon Module 4.
Table 4  
*Teachers Opinion of Additional Information Needed to Implement Each Module*

<table>
<thead>
<tr>
<th>Module</th>
<th>Teachers’ Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nothing.</td>
</tr>
<tr>
<td>2</td>
<td>More instruction on preparing the activity for kindergarten students, such as dividing plates into fourths and cutting the window in the top plate before beginning activity.</td>
</tr>
<tr>
<td>3</td>
<td>They loved the activity.</td>
</tr>
<tr>
<td>4</td>
<td>The students had more questions about the processing/packaging of the chicken meat/eggs.</td>
</tr>
<tr>
<td>5</td>
<td>The instructions and pictures were not very clear for the activity.</td>
</tr>
</tbody>
</table>

**Maintenance**

**Research Question 9: How many teachers are likely to implement the program again?**

Teacher satisfaction and feasibility of implementation are critical for the continuation and replication of the program. Figure 31 shows that 43% reported they were extremely likely to implement the Hybrid-Online Hatch-out Program in their classroom again, while the remainder (57%) indicated being somewhat likely to implement it again.
Figure 31. Likelihood of Teacher Re-implementation
CHAPTER V
DISCUSSION AND CONCLUSION

Discussion

This study involved the development, pilot test, and evaluation of the Hybrid-Online Hatch-out Program. The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance; Re-aim, 2021) provided the basis for the research questions which focused on process and outcome evaluation. One research question was utilized to assess the Reach dimension of the framework and evaluated how many total students participated in the program. The second dimension (Effectiveness) included three research questions. Two research questions focused on elementary student participants’ knowledge of poultry and agriculture prior to program implementation as well as whether participants gained knowledge after program implementation. One research question focused on the change (if any) in participating teachers’ perceptions and knowledge of agriculture as a result of the program. One research question was also used to evaluate the third dimension (Adoption) in terms of the total number of teachers that implemented the program. Three research questions were used to collect data on feasibility of the program as well as participating elementary students’ and teachers’ satisfaction and other perceptions of the program for the Implementation dimension. Finally, one research question was used for the Maintenance dimension related to how many teachers are likely to implement the program in the future. Conclusions and future considerations for curriculum revision, implementation, and evaluation follow.
Reach Conclusion

Reach refers to the number of students who participated in the program. Teachers were asked to report the number of students in their classroom in the initial email sent to teachers prior to entering the Canvas system. Unfortunately, not all teachers responded to the email, so precise reach at Sudduth Elementary School could not be determined. Overall, 215 of students from both locations (Sudduth and Ackerman) were impacted by the Hybrid-Online Hatch-out Program on day one; however, over the duration of the program the number of participants fluctuated resulting in a total of 135 students taking the post-test. Due to Sudduth withdrawing from the program, the number of participants was lower than anticipated. However, the request from Ackerman Elementary for Pre-K and Kindergarten classrooms to participate along with first grade classrooms provided additional participants. More data collection from both Pre-K through first grade across the state will allow for a better understanding of the program and evaluation of the curriculum based on grade level.

Adoption Conclusion

In the 2020 survey assessing Sudduth first grade teachers’ perceptions of the Hands-on Hatch-out Program, 20 of the 23 teachers surveyed were willing to participate in the Hybrid-Online Hatch-out Program. Although many teachers expressed willingness to participate originally, acceptance of the program during the pilot phase showed otherwise. Unfortunately, the specific reasons for lack of adoption at Sudduth Elementary could not be conclusively determined. However, one possible factor could be the workload of the teachers at Sudduth Elementary. Therefore, workload is a factor that will be taken into consideration in the future when implementing the program. To better understand if there are any issues with time allowance to complete the module and/or program, evaluation questions will be added to teacher
surveys. This may identify any issues with the adoption of the program due to a lack of time. Additionally, in case support, assistance, and leadership were factors that affected adoption or implementation (Durlak & DuPre, 2008; Gagnon et al., 2015; Wandersman et al., 2008), in the future, teachers will be provided more face-to-face and Zoom trainings to aid in the implementation of the program as was offered to Ackerman Elementary teachers.

**Effectiveness Conclusion**

Results showed statistically significant changes from pre- to post-test in participating elementary students’ knowledge of poultry and agriculture (short-term outcome). To further enhance agricultural literacy, in the future, additional information on agriculture more broadly could be added as an introduction to the curriculum or inserted throughout each module. Then, questions addressing agriculture beyond poultry could identify if participating elementary students better understand agricultural topics after the program (American Farm Bureau Federation, 2021). More medium-term and long-term outcomes could be assessed through future follow-up evaluation. For example, medium-term outcomes could include identifying job opportunities available in the poultry industry, while long-term outcomes could include students choosing to take agriculture education classes in high school, selecting a college major in agriculture, or participating in agricultural organizations.

Factors such as experience (Nobel et al., 2006), motivation (Dusenbury et al., 2003, 2005; Johnson et al., 2006), and competency (Milligan, 1998) affect program implementation and outcomes. Therefore, teacher knowledge is important to consider. In this study, teachers reported having a better knowledge of both agriculture and poultry after program implementation. As modules were completed, teachers were assessed on their level of knowledge of the day’s topic. All teachers indicated having good to excellent knowledge on each of the
module topics after completing each module; however, in the future, an objective measure that assesses correct and incorrect responses to content-related questions, and not just perceptions of level of knowledge in poultry and agricultural concepts, could be implemented. The Teacher Pre-Survey included such questions to provide such objective data. Unfortunately, these questions were omitted on the Teacher Post-Survey, so that comparison cannot be made.

**Implementation Conclusion**

Satisfaction is critical for program success. As Carroll and colleagues (2007) stated, “the less enthusiastic participants are about an intervention, the less likely the intervention is to be implemented properly and fully” (p. 3). Questions addressing the program as a whole as well as the individual components were asked of teachers. In general, teachers were satisfied with the program and indicated it was feasible to implement.

Teachers explain and instruct the student participants of the Hybrid-Online Hatch-out Program (rather than an external facilitator), so teachers’ knowledge could affect program implementation (Hutcheson, 2020). Therefore, teachers were provided a Teacher Orientation Module to aid with teacher knowledge and program implementation. All teachers found the Introductory Video beneficial to implementation of the program. Comfort levels of teachers were mid-range after completing the Teacher Orientation Module. In the future, more time should be available for teachers to complete the orientation/training module, and a question-and-answer session could be held upon completion of the orientation module. Such a session could be conducted via Zoom or other virtual platform, in-person, or through the Canvas course discussion board. Wandersman and colleagues (2008) have noted the importance of technical assistance and training in increasing program quality.
Teachers’ understanding of the technology is a critical component in the implementation of online programs (Chen & Chang, 2006; Romero-Tena et al., 2020; Roth, 2020) due to the majority of the program being online. While Remann and Kotrlik’s (2009) study found technology anxiety to be a barrier to implementation, teachers in this study reported a high comfort level when using an online platform and indicated having no issues with the online portion of the curriculum.

Teachers accepted the challenge of implementing a hybrid online program, and there was 100% satisfaction with all of the modules as well as the program overall. Teachers reported some level of difficulty in the implementation of the PowerPoint (lesson) and activity compared to no level of difficulty reported for implementation of the module videos. Teachers voiced concerns about the curriculum level appropriateness for Pre-K and Kindergarten students, particularly related to the terminology used, through some comments suggesting “more kid friendly” curriculum geared towards a younger audience such as Pre-K and Kindergarten. While the curriculum was originally designed for an older audience such as first grade, collection of teacher and classroom identifier data will be highly valuable during the design of the curriculum for a younger audience. Because complexity or simplicity of a program can influence program implementation (Gagnon et al., 2015), teachers’ comments will be taken into account when developing a program geared towards those younger age groups.

To assess students’ perception of the program, teachers were instructed to “Ask students to raise their hands if they enjoyed the module. Count the number of students with raised hands and record in the box below.” However, again due to the issue of missing teacher identifiers, there was no way to connect classroom to the number of students’ hands raised. In future implementation, a teacher’s classroom identifier will be a required item on all Qualtrics surveys.
(rather than an optional item). Additionally, grade level and total number of students in the class will be added as an item on the surveys to allow for better identification and comparisons.

While teachers indicated that most students were interested in both the PowerPoints and videos, consideration should be given to teacher comments addressing the need for more interactive content throughout the program. Erickson et al. (2019) found high school students to be disinterested in the online poultry education content compared to that of a hands-on learning approach. Module 1’s PowerPoint lesson had a large percentage (36%) of teachers that felt it was not engaging for students. This could be due to the fact that within that PowerPoint (lesson), students are educated on the week’s largest portion of scientific information. A more interactive approach could be taken in the future that includes possible interactive slides as well as video clips showcasing each stage as part of the PowerPoint (lesson). Providing more interactive lessons would not only be beneficial to a younger audience but to an older audience as well and should help with making the curriculum more level-appropriate for younger students.

Organization and quality of the material could cause issues with satisfaction (Gagnon et al., 2015) thus affecting a teacher’s desire to implement the curriculum again in the future; fortunately, teachers were satisfied with both the organization and quality of the material. All module videos were of good to excellent quality according to teachers; however, satisfaction with the chick video was of some concern. A more creative approach can be used in the future by videoing all the chicks on day one and then showcasing the individual chicks each day rather than repeatedly using the same video of all the chicks.

Teachers found each of the activities to be very to somewhat effective overall. However, some voiced concerns of the complexity of the activities and suggested simpler activities that are not as time consuming. In the future, revisions to the PowerPoint (lessons) and module activities
could include an integration of more interactive module PowerPoint (lesson) to include games or discussions and eliminate some of the more tedious activities. Additionally, a better outline of the activity instructions will be given for all activities that are included.

**Maintenance Conclusion**

Although some of the teachers felt the curriculum was over the heads of students, students still showed an increase in knowledge. All teachers somewhat to extremely agreed that they were likely to implement the program within their classroom again. Collection of data from the same group of teachers with a revised program will be beneficial in the future to address the effectiveness of changes made to the program based on findings from this study. The likelihood of teachers to implement the program within their classrooms for a second time strengthens the conclusion that teachers were satisfied with the program overall.

**Limitations**

As with any research or evaluation study, limitations exist with the data. First, after development of the Canvas course (Canvas Instructure, 2019) in the business (MSU) account, teachers had issues accessing the course due to MSU’s restrictions with log-in credentials. Due to this issue, the Canvas course (Canvas Instructure, 2019) was copied into the free version of Canvas (Canvas Instructure, 2019) to allow users to access the program content. Unfortunately, the free version does not provide access to the same analytics for course access that the business version does. Second, although teachers were asked on each of the surveys to indicate their classroom identifier, teachers were inconsistent with use of the classroom identifier provided to them thus causing issues with comparison of surveys and results. The third limitation is teachers’ inconsistency in completion of surveys as well as students’ lack of completion of tests from pre
to post. While the reasons for this are unknown, they may be due to a lack of time or teacher workload. Fourth, only short-term outcomes were assessed through the evaluation stage of the current study. There was no follow-up collection of data to identify any medium-term outcomes were gained from the program. Fifth, only two schools within a 30-minute radius of one another participated. Sixth, some teachers had previously utilized the Hands-on Hatch-out Program in their classroom prior to the implementation of the Hybrid-Online Hatch-out Program, so they already had some knowledge of the content and the curriculum activities; however, students had no prior experience with the hands-on version.

**Conclusion**

As stated by the National Research Council (1988), “Agriculture-broadly defined—is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies” (p. 8). Nonformal education programs can be implemented as a stand-alone delivery method for agricultural education in the formal classroom or as a supplement to existing formal education. This study involved the development, implementation, and evaluation of the Hybrid-Online Hatch-out Program, a nonformal education program focused on poultry to expand the knowledge of elementary students about a specific segment of agriculture.

While there are barriers to implementation with technology (Redmann & Kotrlik, 2019), teachers were comfortable with the technology leaving the majority of issues due to curriculum. Curriculum revisions to address program concerns found in the current curriculum, as well as curriculum revisions to accommodate a younger and older audience will be addressed in the future. In this study, a statistically significant increase in elementary student participant
knowledge was seen from student pre- to post-test. Additional replication of this study should be considered in different locations as well as with different age groups.

Evaluation is a critical component in nonformal education programs to identify issues in program implementation and to document participant (learner) outcomes. RE-AIM (Re-aim, 2021) is an easy-to-use framework for ensuring that critical dimensions of a program are evaluated. As mentioned in the Limitations section, only short-term knowledge change was assessed. Future research should examine the medium- to long-term outcomes of the sample from this study (and future participants) related to increased agricultural literacy and interest in the poultry or broader agriculture industry. Possible incorporation of this program as a portion of the formal classroom curriculum could also be considered in the future. Exploring options to provide teachers access to the full Canvas version offered through MSU business account would provide evaluators more analytics information regarding teacher access points and times and allow for more data collection.

With the limitations of the current hands-on version of the hatch-out program, the hybrid-online version can provide another opportunity to disseminate nonformal agricultural education to a broader audience of Mississippi youth. With the population of America being so far removed from the farm, programs such as Poultry Hatch-out could increase agricultural literacy and an awareness of agriculture’s importance to society.
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APPENDIX A

HYBRID-ONLINE HATCH-OUT PRESURVEY TO TEACHER- EMAIL
Hello,

My name is Tannah Christensen and I am currently a graduate student at Mississippi State University in the School of Human Sciences. According to our records, you have previously utilized the Mississippi State University Department of Poultry Science Hatch-out Program within your classroom in the past. With an increase in the use of technology by our youth today, I would like to develop a virtual platform of the existing program. It would benefit development if I understood your perceptions of the face-to-face program, technology within your classroom, and other things to consider when designing the program.

Participation in this study is completely voluntary. If you choose to participate, you will remain anonymous and there will be no way to connect you and your answers. There is no risk associated with your participation, and you may stop at any time if you wish to do so. Please click on the link below if you would like to complete the survey; this will indicate your consent to participate. I appreciate your consideration of being a part of this research study and look forward to using the results to inform design of a virtual hatch-out program.

https://msstate.co1.qualtrics.com/jfe/form/SV_0liy2Y6qS0zlqyN

If you have any questions or concerns about this study, please feel free to contact me at t.christensen@msstate.edu or my advisor, Dr. Donna Peterson, at donna.peterson@msstate.edu.

Thank you,

Tannah Christensen

Program Coordinator
46 Old Bully Blvd.
Mail Stop 9665
Mississippi State, MS 39762
t.christensen@msstate.edu
APPENDIX B

HYBRID-ONLINE HATCH-OUT PRESURVEY TO TEACHERS- IRB PERMISSION
Subject: Not Human Subjects Research - IRB-20-276, Virtual Poultry Hatch-out

Date: Friday, July 10, 2020 at 11:03:07 AM Central Daylight Time

From: prm199@msstate.edu

To: Peterson, Donna, Christensen, Tannah

Protocol ID: IRB-20-276
Principal Investigator: Donna Peterson
Protocol Title: Virtual Poultry Hatch-out

The review of your study referenced above has been completed. While we sincerely appreciate the submission of your study, it was determined that your research does not require HRPP/IRB oversight at this time.

If in the future, if your research changes, or you feel that the intent has changed, please feel free to contact our office to determine if an existing data application should be submitted.

Though your research does not currently require HRPP/IRB oversight, we strongly encourage you to use best practices in the conduct of your research. These can include but are not limited to: (a) providing information pertaining to the study so that the participant can make an informed decision; (b) giving them your contact information for future reference; (c) explaining their participation is voluntary and they can stop at any time without penalty; (d) and proper recruitment of participants.

We would like to request that in your recruitment materials, that you mention that our office (the HRPP) has reviewed this study and determined it to be not human subjects research.

The project may proceed without further review from this office.

If you have any questions about this determination, please contact the HRPP at IRB@research.msstate.edu.

Please take a minute to tell us about your experience in the survey below. When logging in, please use your MSU email (ex: abc123@msstate.edu) and login credentials:
https://forms.office.com/Pages/ResponsePage.aspx?id=aNR7YavokWc3SP76t7XIF9uShqNaQAdO9XwCnibYZURU6WQZRRNpRMeH1gELzBCT1RGUFRZdLSy4u
APPENDIX C

HYBRID-ONLINE HATCH-OUT PRESURVEY TO TEACHERS- SURVEY
Virtual Hatch-out Pre-survey

Completion of the survey is voluntary and indicates your consent. You may stop answering questions at any time throughout the survey, and if you skip any questions you will not be penalized.

Q1. In general, how did your students respond to the Hatch-out Program?
- Extremely satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Extremely dissatisfied

Q2. Please indicate the level of difficulty of this curriculum for the students.
- Extremely easy
- Somewhat easy
- Neither easy nor difficult
- Somewhat difficult
- Extremely difficult

Q3. What did you like about this program?

Q4. What did you dislike about this program?

Q5. Would you be willing to participate in an online Hatch-out Program?
- Yes
- No
Q6. What would be challenges with participating in an online version?

Q7. Do you have internet access available to your classroom?
   - Yes
   - No

Q8. What technology is available in your classroom? Please mark all that apply.
   - Computer
   - Projector
   - Smart Board
   - Tablet
   - If other, please list other sources of technology available in your classroom.

Q9. Does each student have an individual computer or tablet assigned to them within your classroom?
   - Yes
   - No

Q10. Would you be allowed to download software onto classroom devices to implement the program?
   - Yes
   - No

Q11. What steps would be needed to get the Hatch-out program’s software onto classroom devices?
Q12. How much time could you commit to an online Hatch-out program in your classroom?

- 1 week
- 2 weeks
- 3 weeks
- 4 weeks

Q13. What are the top 3 things we should keep in mind as we develop an online Hatch-out program for your classroom?

[Blank Space]

Powered by Qualtrics
APPENDIX D

TEACHER ORIENTATION MODULE POWERPOINT (LESSON)
Welcome to the Hatch-out Program!

- This fun and educational program is designed to teach students of all ages the importance of poultry and proper management.
- Through hands-on experience, students will learn how to identify the difference between factual and false information.
- Students will learn the basics of the poultry industry.
- The program includes several activities, including a PowerPoint presentation and a video discussing the poultry industry.

Poultry in general

- Number one agricultural commodity in Mississippi
- 26% of the workforce
- $27.9 billion in 2019
- Popular because it is one of the cheapest meats and provides more protein.
- Separated into two main sections:
  - Broilers: produce the meat
  - Layers: produce eggs in the grocery store

Agriculture in general

- Brookhaven SPS 12/31/16
- Through hands-on experience, students will learn how to identify the difference between factual and false information.
- Students will learn the basics of the poultry industry.

Utilizing Canvas

- Canvas helps to make learning and teaching easier.
- Monitor the PoultryCanvas.
- Students can share their work in Canvas.
- Teachers can share resources.
- Teachers can share activities.

Incubation

- Incubation is used to keep the eggs warm until they hatch.
- The temperature is set at 99.5°F.
- The humidity is set to 65%.
- This helps the embryos get enough air.
- The eggs are rotated to prevent the embryo from developing in one spot.
- The eggs are rotated to make sure the embryo is developing properly.
- Day 18 is when we stop turning the eggs and check them to make sure they hatch.
Chick Development

- It takes 21 days to hatch a chick
- Key days:
  - Day 7: heart beat appears
  - Day 10: egg membrane begins to form
  - Day 15: white of the egg is seen
  - Day 18: yolk sac is a solid mass
  - Day 20: yolk sac is a gas filled cavity
  - Day 21: chick hatches

Caring for chicks

- Once the chicks hatch, they will need to stay in the incubator until their feathers are dry and fluffy.
- Chicks will need a heat source, like a heat lamp, to keep them warm.
- The heat lamp sits on a metal branding or metal rack.
- Chicks are omnivorous, but they mostly eat corn and vegetables.
- There is a list of proteins and vitamins packed in the feed.
- Chick feed has everything it needs in every bite.
- Clear water is important for chicks to drink.
- In chicken houses, we put water fountains for the chicks, so they won’t make a mess around them.

Biosecurity in Agriculture

- Biosecurity – a set of practices employed to prevent the importation of infectious organisms into a food or feed, and their transmission between animals

Biosecurity in Poultry

- Bad examples:
  - Wearing the same boots on different farms
  - Not wearing gloves when handling raw meat
  - Not washing hands after farm visits
  - Good examples:
  - Washing hands
  - Using hand sanitizer
  - Showering in and out
  - Using foot baths

Poultry Industry

- In chicken houses, water fountains are above the chickens, so they don’t make a mess around them or on the floor.
- Insiders are used to keep the birds warm.
- Feeders are on an automated schedule for the birds to eat at certain times of the day.
- Lights also play a role for the layer chickens in order to have the layers on a schedule of laying eggs.

Difference in meat and layer birds

- Layer birds:
  - White feathers – small, framed, white birds
  - Produces the eggs in all grocery stores

- Meat birds:
  - Broilers – large, white birds
  - Produces the meat that is found in grocery stores
**Backyard Flocks**

- Backyard flocks play a large role in their backyard for eggs and protein intake.
- Chickens are used for eggs, eggs, and you can even sell these birds.
- Backyard birds breeds are usually:
  - Barred Plymouth Rock
  - White Plymouth Rock
  - New Hampshire
  - Rhode Island Red
  - Ameraucana

**Products From Chickens**

- Chicken nuggets
- Chicken tender
- Egg
- Breast
- Chicken broth
- Chicken noodle soup
- And many more

**Job Opportunities in Poultry**

- Teacher
- Technician
- Geneticist
- Veterinarian
- Farmer
- Disease-Free Technician
- Human Resources
- Food Safety and Quality Assurance

**Conclusion**

- The poultry industry is a major role in our economy
- Number one agriculture contributor to Mississippi
- Chickens
  - Take 21 days to hatch
  - Require a lot of help when they are first hatched
  - Manure is important in order to keep them safe
- Poultry can offer a plethora of different food options
  - Nuggets, tenders, eggs, etc.
- There are many different job opportunities that can come from the poultry industry

Thank you so much for participating in this pilot test of a hybrid version of poultry hatch-out.
APPENDIX E

PROGRAM IMPLEMENTATION- IRB PERMISSION
Subject: Not Human Subjects Research - IRB-21-149, Hybrid Online Hatch-out Program

Date: Monday, April 5, 2021 at 1:49:57 PM Central Daylight Time

From: alh948@msstate.edu

To: Peterson, Donna, Wells, Jessica, Denny, Marina, Morgan, Mariah, Christensen, Tannah

Protocol ID: IRB-21-149
Principal Investigator: Donna Peterson
Protocol Title: Hybrid Online Hatch-out Program

The review of your study referenced above has been completed. While we sincerely appreciate the submission of your study, it was determined that your research does not require HRPP/IRB oversight at this time.

If in the future, if your research changes, or you feel that the intent has changed, please feel free to contact our office to determine if an existing data application should be submitted.

Though your research does not currently require HRPP/IRB oversight, we strongly encourage you to use best practices in the conduct of your research. These can include but are not limited to: (a) providing information pertaining to the study so that the participant can make an informed decision; (b) giving them your contact information for future reference; (c) explaining their participation is voluntary and they can stop at any time without penalty; (d) and proper recruitment of participants.

We would like to request that in your recruitment materials, that you mention that our office (the HRPP) has reviewed this study and determined it to be not human subjects research.

The project may proceed without further review from this office.

If you have any questions about this determination, please contact the HRPP at IRB@research.msstate.edu.

Please take a minute to tell us about your experience in the survey below. When logging in, please use your MSU email (ex: abc123@msstate.edu) and login credentials:
https://forms.office.com/Pages/ResponsePage.aspx?id=sNtR7YavokWct9P7OTXF9uShqNaQAoSFyXwCNibYZURU1tAVDRRN1pRMEhHJzBCT1RGUFRZRkdLSy4u
APPENDIX F

PROGRAM IMPLEMENTATION - PRINCIPAL EMAIL
Ms. Abraham,

Good afternoon! My name is Tannah Christensen and I am currently a graduate student at Mississippi State University in the School of Human Sciences. I know you are familiar with the hatch-out program that the Department of Poultry Science here at Mississippi State University offers to elementary schools every year. This is usually coordinated through Dr. Jessica Wells. Sudduth generally participates each year and we love working with your awesome faculty! With the recent COVID issues, the option of a hybrid online hatch-out program has been discussed as an alternative to our current hands-on hatch-out program. This option would allow us to still reach students when distance or unforeseen circumstances arise.

For my masters thesis, I would like to address the need for the hybrid online hatch-out program, and implement and evaluate the program in schools. This would help us determine the best design to fit the needs of teachers and students in order to maximize its outcomes in the classroom. This new option would still allow for hands-on activities that would be shipped to the school for each of the classrooms; however, as a substitute to incubators and aquariums being delivered to display in each of the rooms, each classroom would have access (through Canvas) to videos showcasing egg development and hatching of chicks. Simple surveys for evaluation purposes as well as short, child-friendly tests to evaluate program effectiveness would also be available through Canvas.

The reason for reaching out to you is, if possible, I would like to propose implementation of this hybrid online option of the hatch-out program into each of the 1st grade classrooms at Sudduth Elementary. Since there is a large population of teachers at your school and it is close to campus we feel this would be a good starting point to get an idea of whether this format could be utilized in the future. We do not want students to miss out on the live chicks, therefore, after we do the online hybrid format we would be more than willing to still have teachers participate with live chicks if they would like.

We will supply all of the items necessary for in class activities and will not need to enter the classrooms at all with the current COVID restrictions. All we will need is teachers’ willingness to make this possible and one week of their time. This should not take more than 30 minutes of classroom time each day for the duration of the week.

We value your help in coordinating these efforts, as well as your approval in implementing this program and evaluation within these classrooms. If this is a possibility, please contact me at your earliest convenience, and we can coordinate a week that will work for the school to participate and discuss details.

Thank you for your time.

Tannah Christensen
Program Coordinator
46 Old Bully Blvd.
Mail Stop 9665
Subject: Hybrid Online Hatch-out Program
Date: Monday, April 19, 2021 at 3:52:11 PM Central Daylight Time
From: Christensen, Tannah
To: samanthakelly@choctawsd.ms
CC: Peterson, Donna, Wells, Jessica
Attachments: image001.png

Mrs. Kelly,

Good afternoon! I hope all is well, and state testing is going well for everyone. As you may know, I am currently a graduate student at Mississippi State University in the School of Human Sciences. You also may be familiar with the hatch-out program that the Department of Poultry Science here at Mississippi State University offers to elementary schools every year. This is usually coordinated through Dr. Jessica Wells. Ackerman generally participates each year and we have enjoyed working with your awesome faculty! With the recent COVID issues, the option of a hybrid online hatch-out program has been discussed as an alternative to our current hands-on hatch-out program. This option would allow us to still reach students when distance or unforeseen circumstances arise.

For my masters thesis, I would like to address the need for the hybrid online hatch-out program, and implement and evaluate the program in schools. This would help us determine the best design to fit the needs of teachers and students in order to maximize its outcomes in the classroom. This new option would still allow for hands-on activities that would be shipped to the school for each of the classrooms; however, as a substitute to incubators and aquariums being delivered to display in each of the rooms, each classroom would have access (through Canvas) to videos showcasing egg development and hatching of chicks. Simple surveys for evaluation purposes as well as short, child-friendly tests to evaluate program effectiveness would also be available through Canvas.

The reason for reaching out to you is, if possible, I would like to propose implementation of this hybrid online option of the hatch-out program into each or some of the 1st grade classrooms. We will supply all of the items necessary for in class activities and will not need to enter the classrooms at all with the current COVID restrictions. All we will need is teachers' willingness to make this possible and one week of their time. This should not take more than 30-45 minutes of classroom time each day for the duration of the week.

We value your help in coordinating these efforts, as well as your approval in implementing this program and evaluation within these classrooms. If this is a possibility, please contact me at your earliest convenience, and we can coordinate a week that will work for the school to participate and discuss details. I'm also happy to explain further the program and the processes of the program via email, phone, virtual meeting, in-person meeting, etc.

Thank you for your time.

Tannah Christensen
Program Coordinator
325 Wise Center Drive
Mail Stop 9665
Mississippi State, MS 39762
662.325.2853 or 662.325.3416
t.christensen@msstate.edu
APPENDIX G

PROGRAM IMPLEMENTATION- EMAILS TO TEACHERS
Wednesday, September 29, 2021 at 14:32:09 Central Daylight Time

Subject: Hybrid Online Hatch-out Program
Date: Tuesday, April 6, 2021 at 10:46:02 AM Central Daylight Time
From: Christensen, Tannah
To: cchampion@starkvillesd.com, jcampbell@starkvillesd.com, vcaves@starkvillesd.com, lcole@starkvillesd.com, ndavison@starkvillesd.com, jellis@starkvillesd.com, mfloyd@starkvillesd.com, kgartman@starkvillesd.com, khicks@starkvillesd.com, kmason@starkvillesd.com, jmclemore@starkvillesd.com, lonan@starkvillesd.com, aprice@starkvillesd.com, creynolds@starkvillesd.com, jroberson@starkvillesd.com, asheorn@starkvillesd.com, mshumaker@starkvillesd.com
CC: Peterson, Donna, Wells, Jessica
Attachments: image001.png

Good morning all,

My name is Tannah Christensen and I am currently a graduate student at Mississippi State University in the School of Human Sciences. I believe most of you are familiar with the hatch-out program that the Department of Poultry Science at Mississippi State University offers to elementary schools every year. Most of you participate each year and we love working with you. With the recent COVID issues, the option of a hybrid online hatch-out program was developed as an alternative to our current hands-on hatch-out program. This option would allow us to still reach students when distance or unforeseen circumstances arise. For my master’s thesis, I am exploring implementation of this hybrid online version of the hatch-out program. Ms. Abraham has approved your implementation of the hybrid online version in all of the 1st grade classrooms for the week of April 12th thru the 16th.

Implementing and evaluating the hybrid online version of the hatch-out will help us determine the best design to fit the needs of teachers and students in order to maximize its outcomes in the classroom. This new option would still allow for hands-on activities that would be delivered to the school for each of the classrooms; however, as a substitute to incubators and aquariums being delivered to display in the rooms, each classroom would have access (through Canvas) to videos showcasing egg development and hatching of chicks. Simple surveys for evaluation purposes as well as short, child-friendly tests to evaluate program effectiveness would also be available through Canvas.

All documents for the program will be accessible through Canvas. More information regarding how to access the course on Canvas and all materials needed to complete the hands-on activities will be sent before Monday, April 12th. In the meantime, there are some details I need from each of you to better prepare for the hands-on activities:

1. How many students are in your classroom?
2. Does each student have access to an individual computer to table to complete the pre and posttest?
   We would like to test students via online through Qualtrics; however, each student must have access to a computer or tablet to do so. If not, no worries, we will alter the testing methods to fit the needs of your classroom.

I’m extremely excited for this opportunity to implement this program in your classrooms. I am happy to discuss any and all questions or concerns you have, so please feel free to reach out.

Tannah Christensen
Program Coordinator
Good afternoon,

Wow! This is exciting to officially be sending you the instructions and materials needed for the hybrid online hatch-out program. Many individuals have dedicated many hours in the development stages of this program, and we are excited for you all to be participating in the pilot study of this program. I hope you are as excited as we are! Below are a few details you will need to begin this program.

I’ve added each of you as a student to the Canvas course “Hybrid-Virtual Hatch-out Program.” You will receive an email invite to the course. Click on the get started button/link, and it will take you to Canvas. After logging in, you should have access to the course. Once in the course, you will see six modules with the first being the Teacher Orientation module. Each module includes thorough daily instructions that will guide you through all items needed to complete that day’s module and the order in which they should be done. You will first need to complete the Teacher Orientation module prior to beginning Monday’s Day 1 lesson with the students. This module should take no longer than 30-45 minutes to complete. It will serve as an aid in program implementation as it provides an overview of the program as a whole, guidance on how to use the Canvas module, and an overview of the educational components that will be discussed throughout the week.

For each of the modules, there will be a short module evaluation for you to complete to help us assess the program’s effectiveness. If possible, please respond directly after completing the module while it is fresh in your mind. Please be aware there is a question that will include student participation as well (i.e., raise their hand if they liked the module). Please remember, this is the pilot stage of this study, and any and all feedback is valuable to determine program effectiveness.

Each survey including the student pre and post-test will need a number to identify your specific class. **Your class number identifier is 1.** Please provide the class number identifier to each student to include at the top of the pre and post-test as well as the paper drawings that will be turned in after each of the tests. Students will need to include not only the class number identifier, but also their Clever/Ready Too-in number (MSIS number) on all four student evaluations (pre-test, pre-test paper drawing, post-test, and post-test paper drawing).

Each day will include an activity. Some are individual activities, and some are group activities. **All activity sets will be delivered to the school on Monday morning before 8:30 A.M.** Each day’s activity bag is labeled with the day the activity needs to be completed. The white folder in the bag includes the sheets needed for the Monday and Tuesday activities.

**Thursday’s Poultry Industry Jobs activity includes items that could be reused for future classrooms. If possible, please return all items except the starbursts and chicks from the Thursday activity. Wednesday’s Biosecurity activity could include excess items as well, so any items that are leftover, we could reuse. The department will pick up these items from the school on the following Monday.**

I would like to thank you again for your participation in this pilot test. If you have any questions or concerns, please contact me at t.christensen@mssstate.edu, office- 662.325.3416, cell- 662.769.3841.
Fannah Christensen
Program Coordinator
325 Wise Center Drive
Mail Stop 9665
Mississippi State, MS 35762
662.325.2853 or 662.325.3416
T: christensen@msstate.edu

MISSISSIPPI STATE UNIVERSITY
DEPARTMENT OF POULTRY SCIENCE
Hi all,

Good afternoon! Many of you are familiar with who I am, but for those that are not, my name is Tannah Christensen. I am currently a graduate student at Mississippi State University in the School of Human Sciences. I believe most of you are familiar with the hatch-out program that the Department of Poultry Science at Mississippi State University offers to elementary schools every year. Most of you have participated in the past, and we love working with you. With the recent COVID issues, the option of a hybrid online hatch-out program was developed as an alternative to our current hands-on hatch-out program. This option would allow us to still reach students when distance or unforeseen circumstances arise. For my master’s thesis, I am exploring implementation of this hybrid online version of the hatch-out program. Mrs. Kelley has approved your implementation of the hybrid online version in all of the Pre-K thru 1st grade classrooms for the week of May 10th. I hope your schedule will allow you to participate!

Implementing and evaluating the hybrid online version of the hatch-out will help us determine the best design to fit the needs of teachers and students to maximize its outcomes in the classroom. This new option still includes hands-on activities; however, as a substitute to incubators and aquariums being delivered to display in the rooms, each classroom would have access (through Canvas) to videos showcasing egg development and hatching of chicks. Simple surveys for evaluation purposes as well as short, child-friendly tests to evaluate program effectiveness would also be available through Canvas.

All documents for the program will be accessible through Canvas. All materials needed to complete the hands-on activities will be delivered to the school before Monday, May 10th. There are a few things that will allow me to better prepare for the hands-on activities and assessment of students before May 10th. If you will, please let me know:

1. How many students are in your classroom?
2. Does each student have access to an individual computer to table to complete the pre and posttest?
   We would like to test students via online through Qualtrics; however, each student must have access to a computer or tablet to do so. If not, no worries, we will alter the testing methods to fit the needs of your classroom.

You will need to register for Canvas to access the program documents (e.g., PowerPoint, videos, surveys/tests, activity instructions). To do so, follow these steps:

**Instructions to register with Canvas**

1. You should receive an email titled “Course Invitation”.
2. Click the “Get Started” link (blue button).
3. Select the “Create My Account” link if you do not currently have a Canvas account.
4. Create a password.
5. Select register.
Once you are registered and can log in, you will see six modules, with the first being the Teacher Orientation module. This Teacher Orientation module will aid in program implementation as it provides an overview of the program as a whole, guidance on how to use the Canvas modules, and an overview of the educational components that will be discussed throughout the week. Each module includes thorough daily instructions that will guide you through all of the components to complete that day’s module and the order in which they should be done.

Before beginning the Teacher Orientation module, please take the Teacher Pre-Survey. Without the feedback from you all, there is no way for this program to reach its full potential. Please remember, this is the pilot stage of this study, and any and all feedback is valuable to determine program effectiveness. You are a critical piece to this puzzle, and I appreciate each one of your efforts in this implementation phase.

I’m happy to assist in any way possible if there are any questions, concerns, or a need for clarification on anything (Canvas registration, tutorial on the program, etc.). I’ve set aside a few times the week before implementation to address any needs. See the Zoom meeting link below with dates and times. If you would like to join, hop on the meeting, and I will be available to answer your questions. If you cannot join at any of these dates and times, I will be happy to set up an individual meeting at a time that is convenient for you. If Zoom is not an acceptable platform for you, please let me know, and we can meet on whichever is best for you. If you prefer a face to face meeting, I’m happy to come to the school.

Tuesday, May 4th 2:00 P.M.-4:00 P.M.
Wednesday, May 5th 2:00 P.M.-4:00 P.M.
Zoom Link: https://us02web.zoom.us/j/7517669515

I’m extremely excited for this opportunity to implement this program in your classrooms.

Tannah Christensen
Program Coordinator
325 Wise Center Drive
Mail Stop 9665
Mississippi State, MS 37762
662.325.2853 or 662.325.3416
T.christensen@msstate.edu

Mississippi State University, Department of Poultry Science
Good afternoon,
I'm so excited to implement this program into your classroom next week. Many individuals have dedicated
many hours in the development stages of this program, and we are excited for you to be participating in the
pilot study of this program. I hope you are as excited as we are!

Register and Log-in- Friendly reminder to use the 2nd Canvas course invitation to log in since the first
invitation had problems, and use the following instructions to log in. If you received the email invitation
(titled “Course Invitation”), follow these steps:
1. Click the “Get Started” link (blue button).
2. Select the “Create My Account” link if you do not currently have a Canvas account.
3. Create a password.
4. Select register.

However, if you did not receive the email course invitation, please visit https://www.instructure.com/en-
gb/canvas/login/free-for-teacher, and register using this email address. You should receive an invitation
(within your account) requesting you to join the course. Then simply “accept” the invitation.

Teacher Orientation- Once you are registered and can log in, you will see six modules, with the first being the
teacher orientation module. This teacher orientation module will aid in program implementation as it
provides an overview of the program as a whole, guidance on how to use the Canvas modules, and an
overview of the educational components that will be discussed throughout the week. Each module includes
thorough daily instructions that will guide you through all of the components to complete that day’s module
and the order in which they should be done. If possible, you will need to complete the teacher orientation
module prior to beginning Monday’s Day 1 lesson with the students. Please complete the teacher pre-surveys
prior to starting the teacher orientation module.

Module Evaluation- For each of the modules, there will be a short module evaluation for you to complete to
help us assess the program’s effectiveness. If possible, please respond directly after completing the module
while it is fresh in your mind. Please be aware there is a question about student participation as well (i.e.,
raise their hand if they liked the module). Please remember, this is the pilot stage of this study, and any and
all feedback is valuable to determine program effectiveness.

Student Pre- and Post-Test- Students will also complete a pre- and post-test at the very beginning and very
end of the entire program. Student pre- and post-test can be accessed through the link within the module,
QR code within the daily instructions, OR by using the following urls: http://bit.ly/ackermanpre for the
student pre-test and http://bit.ly/ackermanpost for the student post-test. Each of these options are also
available within the Canvas course. If there is a need for paper copies of the test rather than accessing the
test online, I will be happy to provide copies. Please just let me know prior to Monday. Please have students
complete the pre-test prior to receiving any content.

Class Identifier- Each survey, including the student pre- and post-test, will need a number to identify your
specific class. Your class number identifier is 2. Please provide the class number identifier to each student
to include at the top of the pre- and post-test as well as the paper drawings that will be turned in after each
of the tests. Students will need to include the class number identifier and their name on all four student evaluations (pre-test, pre-test paper drawing, post-test, and post-test paper drawing).

Activities and Materials: All materials needed for the activities will be delivered tomorrow morning, May 7th, to the front office before 9:00 A.M. Some are individual activities, and some are group activities. Each day’s activity bag is labeled with the day the activity needs to be completed. The white folder in the bag is labeled with the teacher’s name and class identifier and includes the sheets needed for Monday and Tuesday activities.

Thursday’s Poultry Industry Jobs activity includes items that could be reused for future classrooms. If possible, please return all items except the starbursts and chips from the Thursday activity. Wednesday’s Biosecurity activity could include excess items as well, so any items that are leftover, we could reuse. The department will pick up these items from the school on the following Monday.

Again, I would like to stress how grateful I am for your participation in this program and without the feedback from you all, there is no way for this program to reach its full potential. Please remember, this is the pilot stage of this study, and any and all feedback is valuable to determine program effectiveness. You are a critical piece to this puzzle, and I appreciate your efforts in this implementation phase.

I’m happy to address any issues, questions, or concerns you all may have via zoom, in person, phone, etc. Please let me know if I can help in any way. Office: 662.325.3416 Cell: 662.769.3841
Email: jchristensen@msstate.edu

Tannah Christensen
Program Coordinator
325 Wise Center Drive
Mail Stop 9665
Mississippi State, MS 39762
662.325.2853 or 662.325.3416
jchristensen@msstate.edu

Page 2 of 2
APPENDIX H

MODULE SURVEY
Module 1: Chick Development Post Survey

Please select your class number identifier.

How much of the module did you complete?
- All
- Some
- None

Ask students to raise their hands if they enjoyed the module. Count the number of students with raised hands and record in the box below.

How easy or difficult was it to implement each of the following components?

<table>
<thead>
<tr>
<th>Component</th>
<th>Very easy</th>
<th>Somewhat easy</th>
<th>Just right</th>
<th>Somewhat difficult</th>
<th>Very difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson (PowerPoint)</td>
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<tr>
<td>Video</td>
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<tr>
<td>Hands-on Activity</td>
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</table>

How easy or difficult was it for students to understand each of the following components?

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<td>Hands-on Activity Instructions</td>
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</tbody>
</table>

After completing this module, what is your level of knowledge on the following topic?
### Chick development

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Terrible</th>
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</table>

Please answer the below.

**Overall, how engaging was the lesson (PowerPoint) to the participants?**

<table>
<thead>
<tr>
<th>Very</th>
<th>Somewhat</th>
<th>A little</th>
<th>Not at all</th>
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</table>

**As a whole, how interested were your students in the video?**

<table>
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<tr>
<th>Very</th>
<th>Somewhat</th>
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<th>Not at all</th>
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**How effective was the activity?**

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</table>

**How was the quality of the videos?**

- Excellent
- Good
- Poor
- Terrible

**Were there any issues with the lesson (PowerPoint) that affected implementation?**

- Yes
- No

**Please describe the issues.**

**Were there any issues with the activity that affected implementation?**

- Yes
- No

**Please describe the issues.**
Would you change anything about the lesson (PowerPoint)?
- Yes
- No

Please describe what you would change.

Would you change anything about the activity?
- Yes
- No

Please describe what you would change.

What additional information do you need to implement this module?

Overall, were you satisfied with the module?
- Yes
- No

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Module 2: Responsibilities of Caring for Chicks Post Survey

Please select your class number identifier.

How much of the module did you complete?

- All
- Some
- None

Ask students to raise their hands if they enjoyed the module. Count the number of students with raised hands and record in the box below.

How easy or difficult was it to implement each of the following components?

<table>
<thead>
<tr>
<th>Component</th>
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How easy or difficult was it for students to understand each of the following components?

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</table>

Instructions

After completing this module, what is your level of knowledge on the following topic?
Responsibilities of caring for chicks

Please answer the below.

Overall, how engaging was the lesson (PowerPoint) to the participants?

As a whole, how interested were your students in the video?

How effective was the activity?

How was the quality of the videos?

Were there any issues with the lesson (PowerPoint) that affected implementation?

Please describe the issues.

Were there any issues with the activity that affected implementation?

Please describe the issues.
Would you change anything about the lesson (PowerPoint)?

○ Yes
○ No

Please describe what you would change.

Would you change anything about the activity?

○ Yes
○ No

Please describe what you would change.

What additional information do you need to implement this module?

Overall, were you satisfied with the module?

○ Yes
○ No
Module 3: Biosecurity Post Survey

Please select your class number identifier.

How much of the module did you complete?
- All
- Some
- None

Ask students to raise their hands if they enjoyed the module. Count the number of students with raised hands and record in the box below.

How easy or difficult was it to implement each of the following components?

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Instructions

After completing this module, what is your level of knowledge on the following topic?
Biosecurity in poultry

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<th>Excellent</th>
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<th>Terrible</th>
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<tr>
<td>Overall, how engaging was the lesson</td>
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<tr>
<td>As a whole, how interested were your</td>
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<tr>
<td>students in the video?</td>
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<tr>
<td>How effective was the activity?</td>
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</tbody>
</table>

How was the quality of the videos?

- Excellent
- Good
- Poor
- Terrible

Were there any issues with the lesson (PowerPoint) that affected implementation?

- Yes
- No

Please describe the issues.

Were there any issues with the activity that affected implementation?

- Yes
- No

Please describe the issues.
Would you change anything about the lesson (PowerPoint)?
- Yes
- No

Please describe what you would change.

Would you change anything about the activity?
- Yes
- No

Please describe what you would change.

What additional information do you need to implement this module?

Overall, were you satisfied with the module?
- Yes
- No

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Module 4: Poultry Industry Post Survey

Please select your class number identifier.

How much of the module did you complete?
- All
- Some
- None

Ask students to raise their hands if they enjoyed the module. Count the number of students with raised hands and record in the box below.

How easy or difficult was it to implement each of the following components?

<table>
<thead>
<tr>
<th>Component</th>
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<th>Very difficult</th>
</tr>
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<td>Hands-on Activity</td>
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</table>

How easy or difficult was it for students to understand each of the following components?

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<tr>
<td>Hands-on Activity Instructions</td>
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</tbody>
</table>

After completing this module, what is your level of knowledge on the following topic?

https://mmsite.co1.qualtrics.com/1065905955/1037399667/291281850
<table>
<thead>
<tr>
<th>Category</th>
<th>Excellent</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Terrible</th>
</tr>
</thead>
<tbody>
<tr>
<td>The poultry industry</td>
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<tr>
<td>Difference in meat and layer birds</td>
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<tr>
<td>Products that come from chickens</td>
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<tr>
<td>Job opportunities in poultry</td>
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</table>

Please answer the below.

<table>
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<tr>
<th>Question</th>
<th>Very</th>
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<th>Not at all</th>
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<tbody>
<tr>
<td>Overall, how engaging was the lesson (PowerPoint) to the participants?</td>
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<tr>
<td>How effective was the activity?</td>
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</tbody>
</table>

How was the quality of the videos?
- Excellent
- Good
- Poor
- Terrible

Were there any issues with the lesson (PowerPoint) that affected implementation?
- Yes
- No

Please describe the issues.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were there any issues with the activity that affected implementation?</td>
<td></td>
</tr>
</tbody>
</table>
Please describe the issues.

Would you change anything about the lesson (PowerPoint)?
  ○ Yes
  ○ No

Please describe what you would change.

Would you change anything about the activity?
  ○ Yes
  ○ No

Please describe what you would change.

What additional information do you need to implement this module?

Overall, were you satisfied with the module?
  ○ Yes
  ○ No

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Module 5: Week Review Post Survey

Please select your class number identifier.

How much of the module did you complete?
○ All
○ Some
○ None

Ask students to raise their hands if they enjoyed the module. Count the number of students with raised hands and record in the box below.

How easy or difficult was it to implement each of the following components?

<table>
<thead>
<tr>
<th>Component</th>
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How easy or difficult was it for students to understand each of the following components?

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<thead>
<tr>
<th>Component</th>
<th>Very easy</th>
<th>Somewhat easy</th>
<th>Just Right</th>
<th>Somewhat difficult</th>
<th>Very difficult</th>
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<tbody>
<tr>
<td>Lesson (PowerPoint)</td>
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<td>Video</td>
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<tr>
<td>Hands-on Activity</td>
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<tr>
<td>Hands-on Activity</td>
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</tbody>
</table>

After completing this module, what is your level of knowledge on the following topic?
<table>
<thead>
<tr>
<th>Question</th>
<th>Excellent</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Terrible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview/Recap of the information from all lessons</td>
<td></td>
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</tr>
<tr>
<td>Please answer the below.</td>
<td>Very</td>
<td>Somewhat</td>
<td>A little</td>
<td>Not at all</td>
<td></td>
</tr>
<tr>
<td>Overall, how engaging was the lesson (PowerPoint) to the participants?</td>
<td></td>
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<tr>
<td>As a whole, how interested were your students in the video?</td>
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<tr>
<td>How effective was the activity?</td>
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<tr>
<td>How was the quality of the videos?</td>
<td>Excellent</td>
<td>Good</td>
<td>Poor</td>
<td>Terrible</td>
<td></td>
</tr>
<tr>
<td>Were there any issues with the lesson (PowerPoint) that affected implementation?</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Please describe the issues.</td>
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</tr>
<tr>
<td>Were there any issues with the activity that affected implementation?</td>
<td>Yes</td>
<td>No</td>
<td></td>
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</tr>
<tr>
<td>Please describe the issues.</td>
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</tbody>
</table>
Would you change anything about the lesson (PowerPoint)?

- Yes
- No

Please describe what you would change.

Would you change anything about the activity?

- Yes
- No

Please describe what you would change.

What additional information do you need to implement this module?

Overall, were you satisfied with the module?

- Yes
- No

What do you perceive as advantages of the online hatch-out?

What do you perceive as disadvantages of the online hatch-out?
APPENDIX I

TEACHER PRE-SURVEY
Teacher Pre Survey

Please select your class number identifier.

What grade do you teach?
- Pre-K
- Kindergarten
- 1st
- 2nd
- 3rd

At which school do you teach?

Have you previously utilized the hands-on hatch-out program?
- Yes
- No

Indicate how comfortable you feel to teach using an online platform.
- Extremely comfortable
- Somewhat comfortable
- Moderately comfortable
- Somewhat uncomfortable
- Not at all comfortable

Indicate your level of knowledge of the following topics.

<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Fair</th>
<th>Average</th>
<th>Good</th>
<th>Excellent</th>
</tr>
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<tbody>
<tr>
<td>Agriculture in general</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Poultry science in general</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Poor</td>
<td>Fair</td>
<td>Average</td>
<td>Good</td>
<td>Excellent</td>
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<tr>
<td>-------------------------------------------------------------------------</td>
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<tr>
<td>Responsibilities of caring for chicks</td>
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<tr>
<td>Chick development</td>
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<tr>
<td>Biosecurity in agriculture</td>
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<tr>
<td>Biosecurity in poultry</td>
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<td></td>
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<tr>
<td>The poultry industry</td>
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<td></td>
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<tr>
<td>Difference in meat and layer birds</td>
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<tr>
<td>Products that come from chickens</td>
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<td></td>
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<td></td>
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<tr>
<td>Job opportunities in poultry</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

How much of Mississippi is considered rural?
- 44%
- 32%
- 51%
- 12%

Where is poultry ranked among the top five commodities in Mississippi?
- 1st
- 2nd
- 3rd
- 4th
- 5th

What percentage of farm and ranch families make up the U.S. population?
- 2%
- 55%
- 17%
- 34%
Agriculture is another word for ______.
- urbanization
- farming
- plowing
- raising

What does agriculture provide the world?
- Creates jobs
- Feeds the world
- Drives the economy
- All of the above

How many family-run poultry farms are in Mississippi?
- 870
- 1,700
- 2,300
- 520

What is Mississippi’s largest poultry producer?
- Tyson
- Sanderson
- Peco
- Pilgrim’s
APPENDIX J

TEACHER ORIENTATION POST-SURVEY
Teacher Training Post Survey

Please select your class number identifier.

Was the instructional video helpful?
- Yes
- Somewhat
- No

After reviewing the curriculum and completing this training module, what is your level of knowledge of the following topics?

- Agriculture in general
- Poultry science in general
- Responsibilities of caring for chicks
- Chick development
- Biosecurity in agriculture
- Biosecurity in poultry
- The poultry industry
- Difference in meat and layer birds
- Products that come from chickens
- Job opportunities in poultry

After reviewing the curriculum and completing this training module, how comfortable do you feel about teaching the following topics and activities?

- Not at all
- Slightly
- Moderately
- Very
- Extremely
<table>
<thead>
<tr>
<th>Activity</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Very</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explaining how to responsibly care for chicks</td>
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<tr>
<td>Explaining chick development</td>
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<tr>
<td>Identifying chick development stages</td>
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<tr>
<td>Instructing students on how to complete the life cycle activity</td>
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<tr>
<td>Explaining biosecurity in general</td>
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<td></td>
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<tr>
<td>Explaining biosecurity in poultry</td>
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<tr>
<td>Explaining the importance of biosecurity in poultry</td>
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<tr>
<td>Instructing students on how to complete the sand and glitter activity</td>
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<tr>
<td>Explaining the poultry industry</td>
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<tr>
<td>Explaining the difference in meat and layer birds</td>
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<tr>
<td>Explaining the products that come from chickens</td>
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<tr>
<td>Explaining job opportunities in poultry</td>
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<tr>
<td>Instructing students on how to complete the job opportunities activity</td>
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<tr>
<td>Providing an overview/recap of the information from all lessons</td>
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<tr>
<td>Instructing students on how to complete the chick activity</td>
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</tbody>
</table>

Do you have any other questions about how to implement the hatch-out?
Overall, were you satisfied with the module?

- Yes
- No

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Teacher Post Survey

Please select your class number identifier.

How easy or difficult was each of the following components?

<table>
<thead>
<tr>
<th>Component</th>
<th>Very easy</th>
<th>Easy</th>
<th>Just right</th>
<th>Difficult</th>
<th>Very difficult</th>
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</thead>
<tbody>
<tr>
<td>Program overall</td>
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<td>Canvas</td>
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<tr>
<td>Course format</td>
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<tr>
<td>Hands-on activities</td>
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<tr>
<td>Accessing the videos</td>
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</tbody>
</table>

How satisfied are you with each of the following?

<table>
<thead>
<tr>
<th>Component</th>
<th>Very satisfied</th>
<th>Somewhat satisfied</th>
<th>Neither satisfied nor dissatisfied</th>
<th>Somewhat dissatisfied</th>
<th>Very dissatisfied</th>
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</thead>
<tbody>
<tr>
<td>The program overall</td>
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<tr>
<td>Organization of the program</td>
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<td>Quality of the material</td>
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<tr>
<td>Teacher Orientation PowerPoint (video)</td>
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<tr>
<td>Poultry Hub Australia Chicken Embryo Development video</td>
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<tr>
<td>Hatch video</td>
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<tr>
<td>Biosecurity video</td>
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<tr>
<td>Chicks video</td>
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</tbody>
</table>

Indicate the level of appropriateness of the curriculum for the grade level you teach.

- Very inappropriate
- Slightly inappropriate
- Neutral
- Slightly appropriate
Did the introduction video aid in implementation of the hybrid online hatch-out program in your classroom?

- Yes
- No
- Somewhat

What additional information would be helpful?

Were there any issues with technology when implementing the online portion of the curriculum?

- Yes
- No

Please describe the issues.

What is your level of knowledge on the following topics?

<table>
<thead>
<tr>
<th>Topic</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Very Poor</th>
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</thead>
<tbody>
<tr>
<td>Agriculture</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Poultry science</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

How likely are you to:

<table>
<thead>
<tr>
<th>Task</th>
<th>Extremely likely</th>
<th>Somewhat likely</th>
<th>Neither likely nor unlikely</th>
<th>Somewhat unlikely</th>
<th>Extremely unlikely</th>
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<tbody>
<tr>
<td>Implement the program again</td>
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<tr>
<td>Recommend this program to a peer</td>
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<tr>
<td>Extremely likely</td>
<td>Somewhat likely</td>
<td>Neither likely nor unlikely</td>
<td>Somewhat unlikely</td>
<td>Extremely unlikely</td>
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<td>○</td>
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</tbody>
</table>

Use the knowledge gained from the program outside of the classroom.
APPENDIX L

STUDENT PRE-TEST
Student Pre-Test

Please select your class number identifier. (Your teacher has this number.)

Type in your name:

Which is a broiler?

Choose everything that comes from chickens.

What is a job you can do in the Poultry Industry? (check all that apply)

- Veterinarian
- Nutritionist
- Farmer
- Teacher

What day does a chick hatch?

○ Day 50
Which is an example of good biosecurity?

Can a baby chick keep itself warm?
- Yes
- No

Which bird produces eggs for us to eat?

In the poultry industry, do meat and egg birds live together?
- Yes
- No

Do chickens have teeth?
- Yes
- No
On a piece of paper, write your classroom number identifier, your Clever iReady Log-in number, and draw a picture of the poultry industry.

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APPENDIX M

STUDENT POST-TEST
Student Post-Test

Please select your class number identifier. (Your teacher has this number).

Type in your name:

Which is a broiler?

Choose everything that comes from chickens:

What is a job you can do in the Poultry Industry? (check all that apply)

- Veterinarian
- Nutritionist
- Farmer
- Teacher

What day does a chick hatch?

- Day 21
Which is an example of good biosecurity?

- Day 21
- Day 14

Can a baby chick keep itself warm?

- Yes
- No

Which bird produces eggs for us to eat?

- Rooster
- Hen
- Duck

In the poultry industry, do meat and egg birds live together?

- Yes
- No

Do chickens have teeth?

- Yes
- No
On a piece of paper, write your classroom number identifier, your Clever iReady Log-in number, and draw a picture of the poultry industry.
APPENDIX N

ALL MODULE POWERPOINTS (LESSONS) AND ACTIVITIES
MODULE 1: POWERPOINT (LESSON)

1. Incubation is used to help the eggs grow until they hatch.
2. It takes 21 days for the chicks to hatch.
3. The temperature of the incubator should be at 38.5°F for all 21 days.
4. The humidity in the incubator should be 40-45%.
5. The incubator serves as a nursery for the eggs but the mother hen sits on the eggs to keep them warm.

Day 3

This is the first day we can visually see the chick's heart beating.

Day 10

- The egg tooth has formed by this day.
- Also by this day the chick has its toes and wings.
- The chick also has visible feathers as well.

Day 14

- The chick is getting in position to get ready to hatch.
- The chick places its head under the right wing so that it can use its wing muscles to move around when it starts to hatch.
Day 21

- The baby chick is ready to hatch!!!
- The baby chick "ecliped" the membrane that surrounds him.
- The word pip means the chick took its first breath of air and has begun to crack through.
Monday: Activity

**Chick Hatching Activity**

**Supplies:** popsicle sticks, cutout supplies for chick and egg

1. Color the chicken and egg.
2. Cut out the pieces along the lines.
3. Glue the top piece of the egg on the top of the chicken.
4. Glue the two other egg pieces together while allowing a small hole for the popsicle stick to be able to move through at the bottom of the egg.
5. Glue the chicken on the popsicle stick.
6. Move the popsicle stick up and down to show a chicken “hatching.”
 MODULE 2: POWERPOINT (LESSON)

Chicks get hungry
- Chicks will be able to eat on their own as soon as they hatch.
- Chicks eat a balanced feed that has everything they need to grow.
- There are lots of seeds and grains in the feed for protein that help the chick's bones and muscles to grow and give them energy.
- There are also vitamins and minerals in the feed to help them grow to be strong and healthy.
- They think it is hard to make so that they get all of their nutrients in each bite they take!
- Chicks will use their beak like we use our hands to pick the food up. They do not have teeth but instead position it and use their ground inside their body to grind the feed like our stomach will do.

Don't forget to hydrate!!
- Water is very important for the chicks to drink.
- Water is the most important thing a chick will need.
- Clean water is important for the chicks to stay healthy.
- In chicken houses, we put water above the chicks, because chicks must look up in order to peck it.
Tuesday: Activity

Life Cycle Activity

Supplies: scissors, crayons, paper plates, hole punch, metal brads, glue

Get two paper plates and punch a hole in the middle of each one.

1. Color the pictures from the chicken life cycle sequencing printout.
2. Use scissors to cut on the dotted lines.
3. Write the title “Life Cycle of a Chicken” in the center of the first paper plate and place it to the side.
4. Line up each of the remaining pictures. Glue them in order around the edge of a second paper plate.
5. Cut a three-sided hole (triangle) on the bottom edge of the title plate so that you can see one step of development at a time as you rotate the bottom plate.
6. Place the first paper plate with the title over top of the second paper plate and place a metal brad through the center of both paper plates.
7. Now you can tell the story of a chick hatching from an egg.
The Life Cycle of a Chicken

The Life Cycle of a Chicken

The Life Cycle of a Chicken

The Life Cycle of a Chicken
Module 3: PowerPoint (Lesson)

1. Biosecurity

2. Biosecurity is the practice of keeping ourselves and the baby chicks safe and clean.

3. Good hygiene is a must in the house. Washing our hands after we touch the chicks is an example of biosecurity.

4. Farmers use biosecurity on their farms to keep diseases away from their chickens.

Some examples include:
- Germ make chickens sick.
- Handwashing, handwashing, handwashing.
- Some examples include foot baths:
  - Foot baths have been shown to kill all the bad germs.
  - Avoid foot baths before they walk into the chicken house.

PPE (personal protective equipment) is also used to protect the birds and yourself from disease.
- This can include overalls, boots, wet suits, and gloves.

But... even if we do not use PPE we can keep our chickens safe by washing our hands and keeping them home clean.
- A little soap and water can go a long way!
Wednesday: Activity

**Sand and Glitter Biosecurity Activity**

**Supplies:** glitter, sand, plastic cup

1. Put students in groups of three.
2. Give each student a "chicken coop" dixie cup of sand (fill halfway) and each group a single clear plastic cup that will be shared as a "public community store" cup of sand. The clear plastic cup will be placed in the middle of all students in the group.
3. Let each student pick a color of glitter and have them pour some in the "coop" cup sand. If possible, use a color only once in each group. Add the last color to the clear "public store" cup.
4. Have them "work their chicken coop" by playing in their cup of sand and glitter with their finger. Gently stirring the sand and glitter together.
5. Give instructions like "visit the neighbors chicken coop to your left/right" and have them play in someone else's "coop" cup a few times with their finger, and have them "visit the public community store" one at a time. You can do this as many times as you would like.
6. After everyone is done visiting and working in their coops as well as visiting the public community store, have them look at their cups and their hands. Talk about all the different colors they see in their cups and even on their hands. Ask them to count how many different colors of glitter they have in their coop. Tell them that each color of glitter represents germs from different places and let them realize how easily they spread from person to person and then to their chickens. This is why biosecurity (washing our hands before and after touching our chicks and wearing protective clothing when going in our coop) is very important to keep everyone healthy.
7. Wash hands and dispose of cups of sand.
MODULE 4: POWERPOINT (LESSON)

What is poultry for?

Where does our food come from?
- The grocery store is full of chicken, meat, and eggs. But... how does it get there?
- Do people eat eggs and meat come from the same place?

Types of chickens
- There are two main types of chickens that make the poultry products we eat:
  - Broilers
  - Layers

Where does meat come from?
- Everyone likes chicken nuggets, right?
- Chicken is the most common meat that we eat. All the meat that we eat is actually from the birds.
- Both males and females can be used for meat.

Where do eggs come from?
- We get our eggs from birds called layers.
- Eggs are not classified as much like other birds. They are divided into two groups: layers and broilers.
- Did you know that the color of the chicken's shell determines what color egg the chicken will produce?
- A red chicken will lay a red egg (usually brown).
- A white chicken will lay a white egg.
- They will start laying eggs at 20-26 weeks.

What is the difference in my chickens at home?
- Broilers and Layers are known as commercial birds and these are the birds we get our edible products from.
- Other chickens are known as backyard birds. These are birds we keep as pets at our houses.
Backyard Flocks
- **Backyard Flocks** are chickens that people raise in their backyard.
- A flock is a group of chickens.
- Backyard flocks can produce both meat and eggs and are easily fed. They come in lots of colors, shapes, and sizes.

Poultry is the number one commodity in Mississippi.
- It means it brings in the most money for the state.
- We are number one in the United States.
- Poultry is not just chickens but can include other types of birds that we eat.
- Examples are chickens, ducks, turkeys, and quail.

Top Poultry Companies in Mississippi
- The following companies are Mississippi's top poultry companies and supply farms.
- These companies produce chickens for other companies to market and sell.
- The meat industry is dominated by Colville Agriculture.
- These companies are located in Mississippi.
- Other companies include companies that are large and subcontract to other companies that market the final product.

Job opportunities
- There are many different jobs you can have in the poultry business.
- Some include: egg handlers, feed handlers, and other employees that work in the area.
- These companies are large and subcontract to many different businesses, such as feed companies and other suppliers.
- Quality control is very important in the poultry industry, so it requires a lot of quality control work.
- Poultry workers are responsible for the health and safety of the chickens.
Thursday: Activity

Poultry Industry Jobs Activity

Supplies: chenille chicks, yellow starbursts, fence, chicken coop, dog, corn, chicken feed (clean bag and dirty bag), green felt, mean face, band-aids, vaccines, dirty gloves.

Please return everything except the starbursts to Mississippi State University Department of Poultry Science.

There are many different job opportunities within the poultry industry whether it be a farmer, nutritionist, or veterinarian. However, it is a teacher that has the first impact on the working society. They are the ones who build the initial platform for people to use. This activity will allow the students to step into each role and decide which objects belong in the poultry industry and on a farm in order for it to succeed.

1. Separate the class into groups (3 groups for the entire class).
2. Designate a student in each group who will be a nutritionist, farmer, teacher, and veterinarian.
   Depending on supplies and groups you may have to group students to work together as a set of nutritionists, set of farmers, set of teachers, and set of veterinarians.
3. Pass out each of the supplies for each nutritionist, farmer, teacher, and veterinarian to every group.
4. The students will then each be a teacher, farmer, veterinarian, and nutritionist. In each role, the student will decide what items belong on the farm and will decide the one item that does not belong. Each student will add the supplies they choose that should belong on the farm to the center and begin to construct their poultry farm together. At the end of the project, they should have a completed poultry farm that has safe and healthy chickens.

Nutritionists: corn, a bag of clean feed, a bag of dirty feed (does not belong)

Farmers: fence, coop, dog (dog does not belong)

Teachers: green felt, starburst (represents the book of knowledge for raising chicks), chicks (who sit on the starburst), mean face (bad attitude) (does not belong)

Veterinarians: band-aids, vaccines, dirty/ripped gloves (does not belong)

1. Discuss each job and the items they added:
   1. A teacher builds a solid foundation of knowledge for everyone to be able to be successful.
      The nutritionist, the farmer and the veterinarian would not be able to build the chicken farm without the solid foundation (green felt) and utilize their knowledge gained from the teacher without the books (starburst). They would also not have chickens and food to eat at the end
without the knowledge gained from teachers on how to grow chickens. If the teacher would have added the bad attitude nobody would have learned how to grow chicks properly.

2. The nutritionist has to make sure that the chickens eat a healthy and balanced diet. Without this the chickens would not grow properly. Chickens are just like humans and if they were fed lots of unhealthy food they would not grow up to be big and healthy.

3. The farmer must raise and protect his chickens from harm. It is important for him to keep them in a safe environment and make sure that nothing can hurt them. The dog would not be a good thing to have on a chicken farm because they can hurt chickens.

4. The veterinarian makes sure that chickens stay healthy so they can grow properly. It is important that chickens receive proper care and vaccinations to keep them from getting sick. If a veterinarian did not keep things clean the chickens would not stay healthy.
MODULE 5: POWERPOINT (LESSON)

1. Review

2. - Chicks take 21 days to hatch.
   - They cannot feed themselves yet.
   - They need food and water to help them grow stronger. Dick the duck!
   - Good hygiene will keep them safe.
   - Children do not have much.

3. What is poultry for?
   - Laying produce eggs while 
     studions produce meat.
   - They do not live together in the poultry industry.

4. Review
   - You can have several jobs within the poultry industry.
     - Farmer
     - Meat processors
     - Teacher
     - Veterinarian
Friday: Activity

**Chick Activity**

**Supplies:** egg, egg carton, feather, eyes

1. Allow students to color (or design) the egg carton cut-out.
2. Have the students decorate the carton with the eyes and feathers provided.
3. Color a beak for the egg cartons and attach it with glue.
4. Insert egg in the middle.